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SPOORNET AND TRANSNET SECTORAL REFERENCE PAPER

Louis S. Thompson

Thompson, Galenson & Associates, LLC
2804 Daniel Road
Chevy Chase, MD 20815-3149
301-951-3731
Fax 301-951-8978
<http://www.tgaassoc.com/index.html>

Prepared for the World Bank and
The Government of the Republic of South Africa

lthompson@alum.mit.edu or
lou.thompson@gmail.com

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Executive Summary

Spoornet is a technically competent, monolithic railway that was forced for too long to cross subsidize social services (suburban passengers, intercity passengers and the General Freight Business) from profits earned on two high volume, “world class” export lines (Iron Ore to Saldanha (OreEx) and Coal to Richards Bay (CoalEx)). The eventual, and inevitable, result has been slow traffic growth, a loss of service quality everywhere, limited earnings, and a serious maintenance backlog, especially in locomotives. The question is whether “more of the same” will solve the problem, or whether a deeper reform of Spoornet and Transnet is needed.

Spoornet. The paper concludes that the National Freight Logistics Study (NFLS) contains an acute analysis of the issues and has a number of proposals that can be strengthened to furnish a good place to start on reform: 1) significantly improve the information available to public and regulators about Spoornet’s performance; 2) remove safety regulation from Spoornet and make the safety regulator independent; 3) follow the NFLS proposal to split Spoornet into two networks – a **primary** network that includes the two major export lines as well as the major national lines and international connections versus a **secondary** network that includes the remainder of the system serving the “second economy”; 4) develop track usage charges appropriate for each section of the networks; 5) promote open access to the secondary network, including small regional or local operators, some of which might be private; 6) offer at least some of the secondary network infrastructure to local or private owners if they can operate the lines more economically than Spoornet; 7) leave Spoornet in control of the primary network and approach competitive access on the primary network with considerable caution because, although integrated concessions might be possible for the OreEx and CoalEx lines, the remainder of the primary network might not support competitive access; 8) spin off Transwerk so it can work equally for all rail companies and so that competition for equipment maintenance can be promoted; 9) open up Spoornet’s rolling stock fleet to private ownership and leasing as is typical world practice; and, 10) contract with Spoornet for maintenance and dispatching of the primary and secondary network.

Transnet. No other country in the world has an essentially unregulated monopoly agency that controls all the country’s railways, ports and pipelines. This degree of centralization appears to be a vestige of the siege mentality of apartheid, and no longer meets South Africa’s needs in the modern global economy, as the NFLS recognizes. The continued existence of such a monolith offers few benefits that stand up to scrutiny, and it poses real and significant risks of monopoly behavior and abuse. It has, in particular, not actually produced an efficient operation in any of its areas and has allowed its assets fall into poor condition. World practice would be to break up Transnet into at least four parts: Spoornet; NPA (which could be further divided and devolved to local ownership and control); SAPO (which would largely be replaced by local agencies and private operators competing to provide port operating services); and, Petronet. Each of these agencies is already working on a world scale: they do not need a parent to look after them, especially a parent that has not performed well in the past.

Summary of the Spoornet and Transnet Sectoral Reference Paper

This section summarizes the results of the *Spoornet and Transnet Sectoral Reference Paper*, which was issued in final draft on June 4, 2007, and issued in final form dated October 31, 2007. The final draft was discussed at a conference in Pretoria on August 28, 2007. Where possible, comments from the conference are reflected in the paper. **No comments on the paper have been received from either Spoornet or Transnet.**

Access to officials and information was a significant problem. Much information that is routinely available elsewhere is considered confidential in South Africa, and data that used to be published in South Africa (for example, the *Spoornet Divisional Report*) are no longer made public. Much of the information requested was not provided. Other information was fragmentary or provided under conditions such that the data or the source, or both, cannot be revealed. The facts in the report are thus based on the author's judgment as to reliability or consistency. As yet, no reviewer has identified significant errors of fact that would affect the conclusions.

The report addressed two tasks. First, assess Spoornet's performance in an international context and identify options for vertical or horizontal restructuring to improve the quality and efficiency of its services. In doing so, the paper focuses on freight issues, as the current policy to devolve passenger services to separate institutions (SARCC and Shosolozza Meyl) is committed and well in line with international practice. Second, evaluate Transnet's structure in the context of best international practice and, if appropriate, identify options for restructuring of Transnet.

Spoornet

South Africa has the world's tenth largest railway system. Spoornet is by far the largest freight railway in Africa and carries more freight traffic than any railway in the European Union (E.U.). Unlike many railways in growing economies, Spoornet has fallen behind in the South African economy and in the transport sector. Spoornet's freight tonnage carried did not increase at all, and ton-km grew by only 10 percent, from 1980 through 2005. During the same period, South Africa's GDP grew by over two-thirds.

Spoornet's productivity and efficiency rank in the top twenty of the world's railways, but a more focused look at Spoornet reveals that the averages are misleading. Spoornet actually consists of three systems – the Ore Export (OreEx) line that carries around 30 million tonnes of iron ore annually from Sishen to Saldanha (880 km); the Coal Export (CoalEx) line that carries about 70 million tonnes of coal annually from the mines around Ermelo to Richards Bay (574 km); and, the General Freight Business (GFB) network that carries slightly over 80 million tonnes on the remaining 20,000 km of the system.

Freight traffic is highly concentrated. The densest 2.3 percent of the line-km carries about **one-third** of the entire system traffic (tonne-km), and the densest 6 percent of the line-km carries

half of the total traffic. By contrast, the GFB network, which carries the remaining half of the Spoornet traffic, uses 94 percent of the line-km. Within the GFB, the least dense half of the Spoornet system line-km carries just 3 percent of the traffic. As a result, while the OreEx and CoalEx parts of the Spoornet system are reasonably “world class” in intensity and productivity, the remainder of the system falls below the performance of many railways elsewhere.

The rail network is stratified by maximum allowable axle load and by traction type. The OreEx line permits a 30 tonne axle load, comparable to efficient international heavy haul rail practice. The CoalEx line permits 26 tonnes, which is at the lower end for heavy haul practice. Most of the remainder of the system permits only 20 tonnes, which is very light and restricts Spoornet’s ability to compete with trucks, especially because truck axle load limits are not effectively enforced in South Africa. A significant part of the GFB system permits only 18.5 or even 16 tonnes, further restricting use and increasing costs. In addition, operating efficiency is significantly limited by the need to designate specific equipment to specific parts of the network.

A lack of uniformity in the traction system aggravates the problem. The OreEx line uses 50kV, 50 Hz AC power, which is unusual but economic in this application. The CoalEx line and a few other parts of the system use 25kV, 50Hz AC, which is standard world practice. A significant part of the system, including the Pretoria, Johannesburg, Durban link, and parts of the links to Cape Town, is electrified at 3kV DC, which is now outdated and expensive to operate, especially for longer haul traffic. Another part of the system allows only diesel traction. As a result, Spoornet must operate expensive, multi-voltage locomotives, change locomotives more frequently than otherwise required, maintain more types of locomotives than necessary and pay a penalty in efficiency and maintenance cost for out-dated equipment.

Spoornet’s tariffs also vary. In PPP terms, OreEx tariffs for iron ore are below those of the major comparable carriers in Brazil and the U.S., while CoalEx tariffs appear to be somewhat above high volume coal tariffs in the U.S. GFB tariffs are, however, about five times higher than in the U.S. While international tariff comparisons must be interpreted with care, the conclusion that OreEx tariffs are competitive, CoalEx tariffs are somewhat high, and GFB tariffs are unusually high, seems valid.

Accurate information was not provided to document the past financial performance of Spoornet as an independent entity. Based on available data, Spoornet appears to have been a marginal performer, some years earning slight profits balanced by losses in others. This was probably the result of higher profits on the CoalEx line, at least adequate profits on the Ore Ex line, and losses on the GFB, despite (or perhaps because of) the high GFB tariffs. An indisputable conclusion is that whatever past earnings Spoornet did generate were either not adequate, or were not used, to maintain and replace its assets. As of 2006, Spoornet had not bought a new locomotive for 16 years, yielding an average locomotive age of 25 years versus international targets of around 15 years. Maintenance and capacity problems have become significant, and the Spoornet service quality and safety record are reported to be low and declining. Overall, the profits on the CoalEx and OreEx lines have not been sufficient to cross subsidize the rest of the system, a problem that was further aggravated in the past by the need also to cross subsidize the passenger service losses that Spoornet sustained.

The legacy of high costs and cross subsidies within the system has become unsustainable because the two world class systems do not generate enough cash flow by themselves to pay for the GFB system, and attempts to do so in the past were harmful to all three. This financial balancing act, along with related structural issues, yielded a freight system that is unable "... to fulfill the demand for cargo movement at prices, levels of service, quality of service, and acceptable levels of reliability in a manner that supports the national developmental strategies." (see NFLS discussion)

Continuation of the policies that existed over the past decades will not address this challenge. Instead, the question is whether the appropriate program going forward lies primarily in added capital support, hoping that the system will be able to manage afterwards, or whether a more fundamental change in structure is required. Why did the prior system, fully staffed with highly competent engineers and managers who could produce a technical network that was indeed world class in many respects, end up in a position that is financially weak and operationally unsatisfactory? Will "more of the same," albeit with more money and arguably better management, solve the problem, or should a more fundamental change be considered?

Spoornet has long been operated as a state-owned, monolithic railway. Beginning in the mid-1990s, Spoornet's lagging performance triggered a continuing series of government and consultant studies and recommendations for improved structures. Although one change – the spin off of passenger services and their related deficits – has been implemented, the freight system has remained essentially unchanged.

The lack of change has partly been dictated by specific opposition: labor unions objected strongly to transfer of some functions to the private sector, and clear line of business separation of the various Spoornet activities would threaten cross subsidies that can only be maintained (without explicit subsidy) by a lack of accounting clarity. An equally important factor has been the lack of an agreed and clearly articulated set of transport policy objectives. This dilemma has been further aggravated by the absence of public data about Spoornet upon which to analyze or evaluate Spoornet's performance. To make matters worse, the period of indecision about Spoornet's role and structure caused under-investment in rolling stock and track that will now take years to correct.

The Department of Transport has recently issued the *National Freight Logistics Strategy* (NFLS). Though the NFLS has been the subject of debate, it does furnish a cogent analysis of existing South African transport issues along with a solid **South African** base of ideas about transport structure on which to build. Using this Government vision for freight logistics in South Africa along with its concept of transport sector roles, regulation and desired performance, how might Spoornet best be structured?

Railways are organized along two major dimensions, structure and ownership. Structure covers three stages; monolithic, dominant operator integral with infrastructure while tenant operators pay for access, and full vertical separation with all operators paying infrastructure access charges. The monolithic structure was typical until the early 1990s, when poor results caused

governments to look for alternatives. Tenant operators began with Amtrak in the U.S. and VIA in Canada, because governments wanted to disconnect passenger results from freight so that public support could be accurately targeted to passenger services. Tenant operators have also been used to create competition on the same lines, for example freight trackage rights in the U.S. Full vertical separation of infrastructure from operations began with the European Commission's Directive 91-440 in 1991 and has evolved in many countries as experience has emerged.

Ownership can vary from fully public, through various kinds of joint ventures, to fully private. Full public ownership was the norm (except in the U.S. and Canada) through the early 1990s. Since then, a wide range of options, beginning with outsourcing, extending through concessioning and franchising, and continuing to full privatization, have emerged. Although full privatization has been infrequent (Canadian National and the large Japanese railways are examples), extensive and generally productive use has been made of franchising or concessioning for passenger and freight services. The fully state-owned monolithic model – like Spoornet – is now increasingly rare for all the reasons already experienced in South Africa and elsewhere.

Two approaches for the future of Spoornet are on the table. One, included in the Vulindlela program of Transnet, would retain the existing Spoornet structure and ownership, but submerge it even more deeply within Transnet, leaving Spoornet opaque and largely unregulated. Transnet would use its overall corporate debt capacity, based largely on ports and pipeline earnings, to finance a capital program of rehabilitation and new investment at Spoornet without asking for further public support. Assuming Transnet can execute the very large investment program on time and within budget, this could yield a more stable Spoornet, but it would not necessarily address any of the deeper problems of poor customer focus or limited transport sector competition identified in the NFLS (and in other countries with monolithic, state-owned railways).

The NFLS concluded that the current freight transport system in South Africa is not working as well as it could and that this malfunction is limiting South Africa's growth and participation in international markets. It recommended that: the government should retain majority ownership of critical infrastructure and remain responsible for network development and management; government may involve the private sector under the right conditions, but this should be the exception rather than the rule; cross subsidies should be used so that charges to commercial operators for use of infrastructure can be used to support infrastructure that is non-commercial, but still in the public interest; infrastructure can be managed by government, an SOE, or the private sector, with public operation the default option; private operators on the public infrastructure can be promoted, especially when they create competition on the infrastructure; and, the currently fragmented regulatory approach should be replaced with three transport sector-wide regulators (economic, safety and environment, and security).

From this base, the NFLS defined the concepts for a new Spoornet structure: split the network into Primary and Secondary parts based largely on traffic density; let Spoornet own and operate the Primary network while the Secondary network would be owned and operated by a new "rail utility"; public and private operators would be permitted on the Secondary network on an open

access basis paying non-discriminatory access charges; operators could also be permitted on the Primary network to compete with Spoornet, but access would be limited and controlled by the Minister of Transport.

This report concludes that the NFLS provides a useful framework for developing a reform program for Spoornet and offers a number of suggestions for moving ahead:

- **The key to future reform is better information.** Transnet should issue detailed, public statistics on Spoornet's performance in line with statistics routinely available elsewhere (the STB's *Statistics of Class I Railroads* in the U.S., or the UIC's *International Railway Statistics*, for example).
- **Separation of safety regulation from Spoornet should be completed as planned.**
- **DOT, DPE, Transnet and Spoornet should jointly form a team to develop the Primary and Secondary networks.** Long-term plans for the Primary network should include providing a clear picture of future transport demand along with appropriate standardization of electric traction and axle loads. Spoornet has already developed the analytical tools to do this, but needs policy input from DOT and DPE.
- **The principles of access charging on the Primary and Secondary networks should be developed carefully.** The access charge approach may be quite different on the two networks, and will depend on the financial objectives imposed on the infrastructure provider as well as the competition objectives for the two systems.
- **Open access may be appropriate for the Secondary network, especially if marginal cost access charges are imposed, but it would be potentially risky on the Primary network.** It may be desirable over the medium term to leave Spoornet integrated with the Primary network and not allow competition until the experience with the Secondary network is fully understood.
- **Improved private sector participation in the rail sector is possible if that is an objective.** This could range from encouraging small private or local operators on the Secondary network up to integral concessioning of the OreEx and CoalEx lines. Private participation is politically sensitive in South Africa, so increased private participation should be thoroughly discussed and agreed before proceeding.
- **In line with normal international practice, the maintenance company (Transwerk) could be spun off and even privatized.**
- **The Spoornet fleet should be opened up to private ownership and leasing.** Only one-third of the U.S. rail freight wagon fleet is owned by the Class I railroads: all the rest are owned by small railroads, shippers and other private owners. The Russian railway has a target of having 50 percent of its freight wagons privately owned. Over half of the planned Spoornet investment program is related to rolling stock, a significant part of which could be reprogrammed if private ownership of wagons were encouraged. A good place to start would be the OreEx and CoalEx systems where the equipment is relatively specialized: this could extend to locomotives as well as wagons.
- **For the near future, Spoornet should remain in charge of maintaining, scheduling and dispatching the entire network.** For the Secondary network, this could be done, as in France, by contracting the management of the network back to Spoornet once the system size and access terms have been developed.

Transnet

Transnet is the state-owned, unitary owner and manager of South Africa's railways, ports and pipelines. It operates without effective external regulation (though some partial regulation of port and pipeline tariffs is in the works). As the NFLS emphasizes, Transnet's monopoly franchise is so broad and opaque that it is free to generate monopoly "rents" and then distribute them without effective supervision or challenge. Although Transnet's unitary structure is rooted in the autarchic years of apartheid and isolation when centralized control was unavoidable, no other country in the world has a similar structure because of the harmful effects on efficiency, competitiveness and transparency in the management of public resources. A lack of detailed information makes it difficult to quantify the cost of Transnet's structural inefficiency to the South African economy. Spoornet's high freight tariffs in the GFB business, and the high tariffs and low productivity of the port activities, along with the history of under-maintenance in all areas, are at least indications of a significant underlying problem.

This does not imply that Spoornet, NPA, SAPO and Petronet are not critical to South Africa's economy. Instead it means that the conglomerate whole is less than the sum of its parts, and that proper development of each would be fostered by a different structure along the lines typical of other competitive and market oriented economies.

International best practice would break Transnet into its constituent parts.

- **Spoornet** would become an independent SOE reporting directly to DPE. Over time, Spoornet would be restructured as discussed above, depending on the resolution of policy issues relating to competition and private sector participation. Spoornet might well need continuing public funding, as is the case with many of the world's railways, depending on the social role assigned to it, but this is an issue that should be transparently defined and decided. Profits from the OreEx and CoalEx lines will not support the entire GFB system sustainably.
- **NPA** would be decentralized, devolving significant authority to local agencies, and with at least some competition among ports introduced. NPA's successor agencies would function as landlord managers of port infrastructure with operations handled by separate agencies or companies. Given the national interest in effective port access, there might well remain a national role in financing at least a part of the infrastructure in various ports. **SAPO** would be separated into operating agencies for each port and eventually, depending on local choices, either operated as municipal agencies or transferred to private operators. Both NPA and SAPO are currently profitable, and there is little reason to think that they would need significant public funding, even when separated.
- **Petronet** would be separated and report to DPE at the outset, but might well be a candidate for private operation at some point in the future. Petronet is also sufficiently profitable that it should be capable of fully independent financing, as is the case elsewhere. All new agencies would each report their performance separately, and in accord with international financial reporting standards (IFRS).

One argument for retaining Transnet as the unitary manager of railways, ports and pipelines has been a desire to "coordinate" all of South Africa's transport facilities into a single logistics chain that can compete effectively with those of other countries. This argument ignores the fact that

countries don't have logistics chains – producers, shippers, receivers and transportation companies work together to form them. Public “coordination” is antithetical to the kind of rapid, commercial, and market sensitive decision making that logistics chains require. The current system of international trade is so large and competitive that an incompatible approach by any single country will not promote, and could actually be harmful to its international competitive position.

A supporting contention has been that Transnet's ability to finance itself without added money from the fiscus requires unitary management. This is equivalent to saying that, given a wide enough monopoly over a vital economic sector without effective regulation and with full ability to transfer finances internally without public reporting, Transnet could extract enough in rents to relieve the need for direct public financing of social needs. While this may be true, self financing comes at a high price of internal and external inefficiency -- one that most other countries believe is too high.

To be fair, self-financing, albeit costly to the nation, may have the benefit of stability of approach. Most infrastructure facilities, specifically including railways, ports and pipelines, require steady financing over a long period of years: they often do not do as well in the ups and downs of changing budget priorities in an open and democratic society. Palpably Transnet, and SATS before it, did not succeed in providing adequate and stable financing for any of the functions in the past. In future, however, if management remains in place for a period of years, and if the foundations of the cross subsidies on which financing will be based are not eroded by increasing regulation of port and pipeline tariffs, it is possible that Spoornet, in particular, will receive more capital investment than it would if it were operated separately.

Economies of scale considerations are also used to argue for large entities. This would have little relevance to Transnet since its constituent parts are already large enough to capture whatever economies are available. Transnet management has made progress in reforming the company and planning a large investment program, but the challenge of actually **managing** such disparate organizations as railways, ports and pipelines has not been successfully undertaken elsewhere, partly because of the multiplicity of skills involved, and partly because of anti-competitive concerns.

Transnet argues that it has a “Mandate” to carry out its Strategic Plan and its related investment program and that Government has decided that it should remain unitary for the foreseeable future. Abrupt changes would disrupt this program and add costs if it is completed piecemeal by newly separated agencies. Moreover, Transnet has undertaken a large borrowing program based on its corporate debt capacity that would be complex to unwind if it were separated.

These arguments deserve serious consideration, especially in the timing of any change that is developed. Continuity of policy and purpose is important and restructuring should not be undertaken lightly. At the same time, the mandate is actually for only three years, and is reviewable by either party annually. A responsible modification in the mandate or, indeed, in Transnet's structure, is entirely feasible.

This suggests a modified Transnet structure along the same principles as for Spoornet:

- As a first step, and without necessarily committing to full breakup of Transnet, each of the Transnet divisions should begin to report separately and publicly, in accord with IFRS. This would include separate Income Statements and Balance Sheets for Spoornet, NPA (separately for each port), SAPO (separately for each port authority), and Petronet. Transnet could continue to report on a consolidated basis as well.
- Separate restructuring plans would be developed for each of the businesses, though they might still remain under the overall tutelage of the Transnet holding pending completion of the investment program.
- Transwerk could be added to the Transnet program of spin offs of non-core activities.
- Government would decide on the degree of private involvement in railways, ports and pipelines and incorporate the decisions in the restructuring framework. Private involvement will only be possible if Transnet is disaggregated: it would never be feasible to privatize Transnet as a unitary corporation.
- At some point in the medium term (5 to 10 years), depending on the outcome of the above steps, Transnet as a conglomerate parent could be reduced or eliminated.

Ultimately, the proposed decisions on Spoornet and Transnet involve weighing costs and benefits – economic efficiency versus various measures of equity, the balance between public and private sectors, the importance and value of social and political objectives – that clearly go beyond technical analysis. This paper supports the NFLS in concluding that the vital transport sector in South Africa could be made more efficient and market-sensitive by restructuring. It is now for the policy makers to decide what best serves South Africa's interests.

SPOORNET AND TRANSNET SECTORAL REFERENCE PAPER

Introduction

The Terms of Reference (TOR)

The World Bank, in conjunction with the Government of the Republic of South Africa, assembled a team to examine the structure and function of the network industries (electricity and telecom, as well as rail and ports) in South Africa. This is particularly important in South Africa, both because South Africa has developed economically to a point where efficient functioning of the network industries has become critical to future development and because South Africa's history of apartheid, and the resulting isolation, caused it to adopt a monolithic and centrally controlled approach to networks that was essentially unique in the world (the organizing paper for this study called the structure a "dark shadow," an unusually effective metaphor). Now that South Africa has long since shed the shadow and the isolation and has, in fact, become a driving engine for Southern Africa and a positive example for the entire world, it is appropriate to ask whether a transport sectoral structure, adopted under a totally different set of objectives and pressures, remains appropriate for a dynamic, outwardly focused and market oriented economy.

The TOR for this paper posed five questions with respect to the South African transport sector. In interpreting these questions, "Transnet" is the State Owned Enterprise (SOE) that owns and controls the country's railway network ("Spoornet"), all of the nation's ports through the National Ports Authority (NPA) and South African Port Operations (SAPO), and the nation's pipeline network through Petronet. With revenues of Rand 26.3 billion, assets valued in excess of Rand 77 billion, and over 65,000 employees, Transnet is an enormous undertaking whose effective functioning is critical to the successful development of the economy of South Africa.¹

1. Evaluate the extent to which Transnet's dominance deviates from international policy developments.
2. Identify options for the restructuring of Transnet
3. Assess the operational and financial performance of Spoornet
 - Scale
 - Traffic
 - Km of line
 - Locomotives
 - Wagons
 - Freight tonnes and tonne-km
 - Business lines and major movement characteristics
 - Regional patterns

¹ Transnet, Annual Report 2006, page 1 and page 2.

- KPI's (traffic density, locomotive productivity, wagon productivity, labor productivity, locomotive availability, wages/revenues, average length of haul, revenue/cost margins and investment plans and schedules)
4. Identify options for vertical and horizontal restructuring of Spoornet.
 5. Evaluate the operating performance of SAPO (average vessel waiting time, working days per year, working hours per day, tonnes per vessel day, and containers per vessel per hour)
 6. Identify options for introducing competition in ports and assess the likely impacts of deregulation and privatization on port performance, and
 7. Assess the progress made in following the mid-2003 announcement by the government of South Africa of its intention to transfer the operations of all commercial ports in the country to the private sector.

This first part of the paper will deal with railways and with the structural options for Spoornet and Transnet, primarily from the point of view of land-side (surface) transport. The ports issues have been handled in a separate paper (see Bell and Bichou, 2007). For this reason, the first four questions raised will actually be easier to address in a different order. That is: first, the paper profiles Spoornet both domestically and internationally; then, it discusses the structural options for Spoornet in the light of the actual challenge and international experience; next, based on the available options and on the current analysis and thinking about Spoornet structure in South Africa, it suggests ways to improve Spoornet's structure; then it compares Transnet's structure with that of other countries; and, finally, it suggests structural improvements in Transnet in the light of Transnet's performance, international experience and the specific values and challenges of South Africa.

A statement about information and feedback

Data collection for this study has been difficult. During a one week visit to South Africa in January 2007, it was extremely difficult to obtain appointments with many senior officials in many agencies. It was also not easy to meet with less senior officials who could have provided information (but who would not do so without authorization from a senior level). With some exceptions, follow up questions have been answered slowly, if at all. After the discussion seminar in Pretoria on August 28 and 29, 2007, some additional data were provided by Spoornet. These data have been fully incorporated in this report, but were fully in line with data already in hand and had no significant impact on the conclusions in the report.

The reasons for the lack of readily available information that would be routinely available on most of the world's railways are not clear. Perhaps some historical Spoornet information has been lost in the transition from the old SATS to Transnet control. Perhaps the increasing desire at Transnet to develop a tightly integrated company has been in conflict with the detailed accounting separation that would be needed to report Spoornet as a separate entity. Possibly the issue of structural change at Spoornet and Transnet is sufficiently sensitive that none of the parties are interested in providing information that might be used against them. Quite likely each of the parts has guarded its information under the "knowledge is power" principle. The result has been significant gaps in information, and delays in the information actually received. The data

being used are thus a collection of information from many sources, some of which are in conflict, and many of which cannot be cited.

A related problem has been one of confidentiality. That is, people not wanting to assist the project have simply declared that requested information is sensitive and have refused to provide it. On the other hand, people wishing to aid the analysis have provided data or reports that are said to be confidential. The exact provenance of the reports cannot always be documented or cited, so the value of the information may be compromised. The reasons for the confidentiality are also unclear: most of the information would be readily available elsewhere. Some of the information is said to be commercially sensitive, but it is unclear from whom it needs to be concealed.

Whatever the reasons, the conclusions in this analysis unfortunately have to be understood as reluctantly and unavoidably being based on a lower level of data quality and quantity than would be desirable. In a number of cases, a fact or argument appears to be asserted, when it actually could be documented from a source provided in confidence. The author's judgment has been used to assess the various data sources and choose the information that appears most reliable. Anyone wishing to replace a proposed fact with a more accurate or authoritative one is invited to do so – on the record. Conclusions drawn from the information are, of course, the author's alone.

It is particularly regrettable that Transnet has thus far not commented on the report, despite having had the draft final version in June, and having reviewed the entire report in late August. The schedule for the report makes it necessary to issue the report without Transnet's comments. If comments are received in future, the report can be reissued, with Transnet's comments and the author's response appended.

Freight focus

This paper will focus on freight issues in Spoornet, though aspects of rail passenger service will be a part of the discussion of structure of Spoornet. The question of the devolution of suburban passenger services to a separate entity (SARCC) has been under consideration in South Africa for at least ten years, and progress has been made in doing so. Devolution of intercity passenger services to a new company, Shosolozha Meyl, has also progressed to the point where, as will be discussed later, the issue is implementation, not policy formulation. The significant remaining issues of transport structure lie in freight.

“Where angels fear to tread”

Reform of transport structure, especially railway structure, is always a fraught political issue. Transport is a critical factor in economic development and governments ignore transport efficiency at their peril; but, because of a pervasive impact on various potentially conflicting groups within a society – industries, regions, cities, labor unions, cultural and historical interests – transport policies are often subject to an unusual degree of political scrutiny.

The typical symptom of conflict transport experts have learned to look for (“after all is said and done, a lot more is said than done”) is exemplified with unusual clarity in South Africa. The reasons for, and the issues relating to, transport reform have been raised a number of times, and with impressive force, over the last decade in South Africa, beginning with the 1996 “White Paper on National Transport Policy,” continuing through “Moving South Africa: A Transport Strategy for 2020,” in 2000 followed by the “National Freight Logistics Strategy” in 2005 and the “National Land Transport Strategic Framework 2006-2011” in 2006. It would be difficult to find another country in which the basic analytical homework has been done better or more professionally. As a result of this work, the options are already on the table (have been on the table for years) and responses have been framed a number of times. And yet, little change has actually been implemented. The reason, inevitably, is that reaching the greater good is stalled by the specific costs (and opposition) that change imposes.

The basic problem that an international expert faces is that each country legitimately places different weights on the various benefits and costs of change. For this reason, an international perspective can offer an analysis from outside, can help in defining what works and does not work elsewhere, and can suggest how the country’s stated objectives might best be maximized. An outside observer has less to offer when internal social and political debates are held. South Africa, with its unique history and mix of cultures and political values, is a particularly striking example of the phenomenon, and only South Africans can make the final judgments. The discussion below has been written, and should be read, with this caveat in mind.

Spoornet In Perspective

Railway system and operating characteristics

Railways can be measured in many ways, both in size and scale and in indicators of performance. Table 1 provides an overall summary of most² of the world’s railways, showing size and scale and a number of performance indicators. It is readily apparent from Table 1 that Spoornet is one of the world’s major railway systems. Table 2 makes Spoornet accomplishments clearer. Taking a rough average of the various rankings, Spoornet is about the tenth largest railway in the world, accounting for around two percent of railway facilities and freight activity (slightly more in electrified lines). Again at the very average level (to be qualified below), Spoornet ranks somewhat lower in performance measures (around 20th) except for labor productivity, where it ranks quite highly (sixth).

Spoornet’s importance in the Sub Saharan Africa (SSA) context is much greater. Using about one-third of the staff and line kilometers, and about two-thirds of the locomotives and wagons, Spoornet produces nearly 90 percent of the SSA freight traffic. In intensity of use of staff and lines, Spoornet ranks at the top in SSA, and is second only to the mining railway of Gabon in usage of wagons (as discussed below, performance on the export oriented parts of Spoornet’s system would far outrank the Gabon concession). Spoornet’s average length of haul is relatively

² Potentially significant railway systems excluded are Australia (because of complexity and scarcity of data), Azerbaijan, Tajikistan and Turkmenistan (lack of data).

short, a fact that has adverse competitive implications vis-à-vis trucking, especially on the non-export oriented parts of the Spoornet network.

Figure 1 gives a summary of Spoornet's traffic activity over time by comparison with the growth in the South African economy. In basic terms, Spoornet's traffic has not been closely linked to GDP. Tonnes originated have been stagnant – essentially the same in 2005 as in 1980 and with very little change over the last 10 years. Tonne-kms have shown nearly the same pattern: slow growth, primarily related to a slight increase in the average length of haul rather than underlying volume growth in tonnage. Over the 1980 to 2005 period, while GDP (in constant Rand) grew steadily by a total of 67 percent, tonnage did not increase at all, and tonne-km grew by only about 11 percent. This relationship is indicative of a picture common elsewhere: more recent growth in the South African economy has been concentrated in sectors that are not as dependent on low cost, bulk transport, and Spoornet has lost market share to trucking.³

Figures 2 and 3 provide a picture of Spoornet traffic (tonnes and tonne-km) over time according to the major categories by which Spoornet has tended to be managed: OreEx (Iron ore export traffic on the 880 km line from Sishen to Saldanha), Coal Export (CoalEx) on the 575 km line from coal mines around Ermelo to the port at Richards Bay, and the general freight business (GFB) that reflects the remainder of Spoornet's traffic that is spread over the entire system (see Figure 4 map of the Spoornet system). These figures show slowly growing traffic on the OreEx and CoalEx lines, which taken together represent somewhat over half of Spoornet's traffic combined with actual **shrinkage** in the GFB group.

Tables 3 through 13 provide a much more detailed analysis of Spoornet's traffic by commodity grouping and over time:

- Tonnes (Table 3)
- Percent of tonnes (Table 4)
- Tonne-km (Table 5)
- Percent of tonne-km (Table 6)
- Revenue in current Rand (Table 7)
- Percent of Revenue (Table 8)
- Average length of haul in km (Table 9). This is calculated as tonne-km/tonnes.
- Revenue/tonne-km in current Rand (Table 10)
- Revenue/tonne-km in constant (2005) Rand (Table 11)
- Revenue/tonne-km in U.S. dollars at Official Rate of Exchange (Table 12). This uses the official Rand to dollar exchange rate of the year.
- Revenue/tonne-km in Purchasing Power Parity (PPP) adjusted International dollars (Table 13). This converts the official exchange rate into the PPP rate for the year.

³ Prior to the 1970s deregulation of transport (NFLS, page 15), freight moving beyond 80 km was required to move by rail unless a permit to move by truck had been granted.

There are a number of useful conclusions to be drawn from these 11 Tables.⁴ First, as mentioned above, the CoalEx and OreEx lines play a disproportionate role in Spoornet's activity, and this disproportion is growing. Taken together, they represent about 7 percent of Spoornet's line kilometers. On this limited system, in 1991 they represented about 39 percent of the total tonnage: by 2005, this had grown to 54 percent of the tonnage total. In 1991, they developed nearly 47 percent of Spoornet's tonne-km, rising to nearly 60 percent in 2005. The revenue picture for the two lines is similar with respect to growth. In 1991 the two lines generated 23 percent of revenue: by 2005, this had risen to 40 percent. There is a more significant aspect of the revenue picture in that, though the OreEx line generated fully 30 percent of Spoornet's tonnage and 24 percent of its tonne-km, it only generated 7 percent of revenue. It is common in international railway systems that traffic tends to be concentrated on a limited part of the system, but Spoornet's degree is unusual. It is also common that specific commodities travel at tariffs far below the average for the railway, but tariffs on the OreEx line are markedly lower.

The GFB operation, though it uses essentially the entire 20,247 km of the system, represents a limited and shrinking part of the traffic. Between 1991 and 2005, the tonnage percentage fell from 61 percent to 46 percent; the tonne-km percentage fell from 54 to 40 percent, and revenue fell from 77 to 70 percent of the Spoornet total.

Figures 5 and 6 together display another facet of Spoornet's performance between 1991 and 2005. From 1991 to roughly 2000, Spoornet was able to generate improvements in labor and (to a lesser extent) wagon productivity to provide significant tariff reductions, in real terms, to the three lines of business. Since then, as the productivity trends have flattened, tariffs have remained essentially the same for the OreEx and CoalEx lines, and have actually increased in the GFB sector. There is at least anecdotal evidence to suggest that significant labor rigidities remain in the Spoornet system, and that costs could be lowered further with more flexible conditions.

Another comparison that can be made between Spoornet's businesses and railways elsewhere can be seen in Table 14, which contains data for the three business lines of Spoornet, three Brazilian railway concessions, the overall U.S. Class I system and the Canadian system (primarily the Canadian National Railroad and the Canadian Pacific Railroad). This comparison underlines the tripartite nature of Spoornet's system: two essentially world class systems along with a "remainder" network that is much less economic.

The three Brazilian railways are particularly interesting because they are specialized in hauling iron ore and they are privately operated. Two of these – Estrada de Ferro Vitoria a Minas (meter gauge) and Estrada de Ferro Carajas (broad gauge) -- have always been private and were owned and managed by the Brazilian conglomerate Companhia do Vale do Rio Doce (CVRD). The other Brazilian railway -- M.R.S. Logistica (also broad gauge) -- was originally a part of the

⁴ Detailed data were not available prior to 1991. In all of these tables, the data for tonnes and tonne-km for 1991 and 1995 are estimates because the method of data collection changed slightly beginning in 1996, as stated in the tables. This change does not affect any of the paper's conclusions.

old Brazilian National Railways (RFFSA) but was concessioned in 1996. It is not possible to single out parts of the U.S. and Canadian systems that are similarly specialized, so the comparisons are limited to system averages.

The productivity comparisons are relatively straightforward: OreEx and CoalEx **have** been generally world class, whether measured against special purpose systems or against the best of international freight railway practice.⁵ GFB does not do as well.

From another perspective, though, Table 15⁶ (along with Table 14) compares Spoornet's tariffs in particular commodities with those of the U.S. and Brazil. It should be emphasized that tariff comparisons are particularly difficult, partly because lengths of haul are different, and partly because currency conversions are never precise. In general, shorter lengths of haul lead to higher tariffs per tonne-km, so railways with different lengths of haul may well legitimately have different tariffs. As Table 14 shows, the lengths of haul for the Brazilian railways are very similar to those in South Africa whereas the North American railways enjoy a much longer typical shipment length: a part of the tariff differences can be explained by this difference. In addition, international currency comparisons are confounded by the fact that official rates of exchange often do not accurately reflect the relative values involved in similar activities in different countries. Purchasing Power Parity (PPP) comparisons were developed to allow for this disparity, and are used in this analysis whenever inter-country comparisons are provided, with a full allowance for the approximations involved. It is the best that is available.

With these *caveats* in mind, however, Tables 14 and 15 support several significant conclusions. Overall, Spoornet's tariffs are much higher than in the U.S. and Canada, averaging five times higher, with a range from three to eight times. The one widely diverging tariff is the OreEx line carrying iron ore, where the Spoornet tariff is actually slightly lower than the U.S. and Canadian average and is actually lower than the U.S. tariff specifically for iron ore in 2004. Spoornet's iron ore tariff is also lower than the tariffs on the roughly comparable Brazilian railways that specialize in iron ore transport. By comparison, tariffs on the CoalEx line are not lower than overall U.S. and Canadian tariffs, and they are actually significantly higher than U.S. coal tariffs in 2004. Overall, the "world class" sobriquet may well apply to the scale and productivity of the operations of the OreEx and CoalEx lines, but only the OreEx line qualifies in terms of tariff practices. GFB falls behind –significantly behind – by these standards.

⁵ The operational data, and thus the productivities for the OreEx and CoalEx lines of Spoornet are calculated based on data provided in 2004 in the Spoornet Divisional Annual Report. It is not clear how the data provided are defined, and thus, the calculations in Table 14 may be approximations. It is unlikely that more precise data would alter the basic comparison of the two high density Spoornet lines with other similar systems.

⁶ Note that Table 15 is based on 2004 results whereas Table 14 is based on 2005. This is necessary because 2005 commodity specific data are not yet available to the US. The one-year difference is not significant for the U.S., but is significant for Spoornet because of the changes in the value of the Rand. This illustrates the problems with currency conversion and comparison.

Figures 7 through 10 serve to reinforce the above classification graphically. In Figure 7, the line traffic density (measured as million gross tonne-km/km of line) varies widely. Spoornet has classified the system as between high density export lines (1,609 km), core network with traffic density > 5mgt/year (6,994 km), non-core with traffic between 0.2 mgt/year and 5 mgt/year (7,905 km), non-core with traffic below 0.2 mgt/year (1,136 km), no service (but still in existence 2,252 km) and tracks that have already been removed, but for which the ownership of the underlying right of way is presumably still in Spoornet control (754 km). There are also 503 km of lease lines. The total freight network is 18,147 km, and the total Spoornet network is 20,339 km. In other terms, the export and core lines add up to 8,603 km, which is called the Primary Network: the Secondary Network for freight thus includes about 9,544 km of line.

Figure 8 gives a picture of the extreme concentration of the traffic on Spoornet's network. As this figure shows, the densest 5 percent of the network carries about 42 percent of the traffic, the densest 10 percent carries about 65 percent of the traffic, and the first half of the network carries about 98 percent of the traffic. Put a different way, the most lightly used half of the network carries only about 2 percent of the traffic.

Figure 9 gives another perspective to the definition of the Spoornet network, showing the various axle load classifications that have been established. Axle load is a crucial variable in railway economics, as it determines the amount of cargo that can be carried in a single wagon (modern freight wagons have 4 axles, so the total gross weight of the wagon cannot exceed 4 times the axle load). The OreEx line, at 30 tonnes/axle, is in fact world class: very few heavy haul railways operate much above this level (maximum U.S. practice is around 35, a few Australian coal carriers are attempting to operate at 40). The CoalEx line, at 26 tonnes per axle, is at the lower end of what would be considered heavy haul in world railway freight practice. All of the rest of the system operates at 20 tonnes/axle or less, which will be a severe constraint on the ability of Spoornet to keep costs down, and means that South African trucks, which are allowed to operate at relatively high axle loads (limits that are apparently not well enforced), are able to offer stiffer competition than might be the case elsewhere.⁷ As discussed later, 20 tonne/axle railway lines, especially if trucking axle loads are unusually high (and not well enforced), are not compatible with a goal of shifting freight traffic from highway to railway.

To complete the physical picture, Figure 10 shows the extent and type of electric traction operated by Spoornet. Significantly, the OreEx line operates at 50kV, 50 Hertz (Hz), a system that is unique on Spoornet and is actually quite unusual in the world: it is, however, quite efficient and has probably contributed to the low costs on the line. Other parts of the system (including the CoalEx line) operate at 25kV, 50Hz, which has become the modern standard for almost all railways. Unfortunately, for historical reasons, a significant part of the system still operates using 3kV DC power – a type of traction power that has gone out of date and would

⁷ The South African National Roads Agency Limited (SANRAL) complains that, with respect to truck overloading, “[t]he blatant disregard for the law and disrespect for a national asset – the road network – has required a greater than necessary effort by the Agency to control overloading. The situation was compounded when permissible axle loads were increased without a commensurate increase in the monetary allocations to roads authorities.” See SANRAL, “Horizon Twenty Ten,” page 20.

rarely be installed in a new long distance system. The existence of the DC system adds an extra disadvantage to the low axle load lines, making them even more uneconomic. In addition, in operating three systems, Spoornet is forced to incur higher costs, either by changing locomotives at electrification system boundaries (extra operating and labor costs), or by employing multi-voltage locomotives that are significantly more expensive to buy, operate and maintain.

Spoornet finances

It is difficult to evaluate Spoornet's actual financial performance. In the past, Spoornet income statements and balance sheets were not always available, were not prepared in accord with international standards, and were not clearly separated from the parent SATS. More recently, though financial reporting standards are become clearer, Spoornet has been even more deeply submerged within its new parent, Transnet, and developing an accurate, standalone picture has not been possible. For these reasons, Spoornet's financial results have to be seen as generalizations.

With this in mind, Spoornet was considered to be at best marginally profitable, and often unprofitable. This overall picture was thought to be composed of a balance between the OreEx lines and CoalEx lines that have been considered to be profitable, or even extremely profitable, and the GFB system that has been seen as unprofitable. The data available have shown quite small profits, and some losses, over the past five years. In the more distant past, Spoornet's finances were even more strained by the need to finance not only the light density lines but also passenger losses on suburban and intercity passenger services. Indications from confidential sources suggest that the CoalEx line is, in fact, highly profitable, which is consistent with the productivity of the line and the relatively high tariffs on the coal moved. The OreEx line appears to be profitable as well, but the rate of profitability is roughly adequate, not high: this is consistent with the extremely low tariff charges, even though efficiency is high. GFB is not profitable, even with high tariffs because of high costs caused by low efficiency. Absent really transparent accounting for a standalone Spoornet, in accord with IFRS, and in accord with lines of business, further detail would not be particularly useful. Fortunately, it is probably not necessary to be much more precise for the purposes of the discussion that follows.

What **is** well documented is that the "profitability" of Spoornet in the past (whatever it might have been if accurately measured and reported) was not adequate (or, at least, was not used) to maintain and replace the critical assets of the system. The average age of a locomotive is now around 25 years versus international practice that aims at 15 years or so.⁸ The average age of freight wagons is 25 to 30 years; again well above international best practice. Similar data are not available on the infrastructure, but there is general agreement that there is a maintenance gap, certainly outside the OreEx and CoalEx lines, and even the customers on these lines complain of unreliable service that may be caused by infrastructure and rolling stock

⁸ As of 2006, Spoornet had not bought a new locomotive for 16 years, and the specialized locomotives on the OreEx lines, in particular, may be in need of near-term rehabilitation or replacement. This may be the reason why the first new locomotives in the capital plan are targeted for the OreEx and CoalEx lines.

maintenance problems. There is also a capacity gap on the OreEx line. In addition, the recent safety record of Spoornet is said to be unacceptably low and deteriorating, another indication that not enough money was generated from the profitable segments of the system to cover losses on unprofitable parts of the system and simultaneously provide for adequate maintenance and replacement of rolling stock and infrastructure. The legacy of cross subsidies and high costs has clearly extracted a high price.

In summary terms, Spoornet is actually **three** railways, with widely disparate performance. Two of these railways, OreEx and CoalEx, may be world class operations technically and managerially, and they are probably profitable enough to provide for adequate maintenance and replacement along with an acceptable return for their own systems. The CoalEx line may be the stronger of the two in profitability.

This said, the two world class systems are simply not capable of supporting the remainder of the system. They do not generate enough cash flow by themselves to pay for the GFB system, and attempts to do so in the past have been harmful to all three. The net result of this financial balancing act, along with structural issues to be discussed below, is a freight system that is unable “to fulfill the demand for cargo movement at prices, levels of service, quality of service, and acceptable levels of reliability in a manner that supports the national developmental strategies.”⁹ According to the NFLS (page 13), “[r]ail customers who were surveyed expressed dissatisfaction with rail operations and rated rail as significantly below expectations. Customers who use rail do so for goods that are least sensitive to time and reliability. The indications are that many customers have contracted road hauliers to provide services where reliability and time are important. Restoring rail reliability is fundamental, and is the single most important challenge facing the freight logistics sector in South Africa.” Similarly, the SAICE Infrastructure Report Card for South Africa rated the CoalEx and OreEx lines as B (not A, interestingly), but rated the GFB system as a C, with the remainder of the system even worse.

It is clear that a continuation of the *status quo* policies that existed over the past decades is unlikely to address this challenge. Instead, the question is whether the appropriate program going forward lies solely in added capital support with the expectation that the system will be able to manage afterwards, or whether a more fundamental change in structure is required.

Put a different way, it is critical to think about **why** the prior system, fully staffed with highly competent engineers and managers who could produce a technical network that was indeed world class in many respects, ended up in a position that is financially weak and operationally unsatisfactory. Only then can we reasonably address the question of whether “more of the same,” albeit with more money and arguably better management, will actually solve the problem, or whether something more should be considered?

⁹ NFLS, page 11.

Structural Options for Spoornet

The current situation

Spoornet has long been operated as a highly integrated, state-owned “monolith,” just as have many railways elsewhere. Over the past two to three decades, most countries have concluded that this type of railway structure is not appropriate for modern and dynamic economies that rely more and more on market forces and that are shifting the balance of activity away from production of bulk commodities and toward high value commodities and services.

Partly for these reasons, the question of an appropriate structure for Spoornet is not a new issue. In fact, there have been a number of proposals and studies for changes in Spoornet’s structure and ownership, beginning at least in 1994 and extending through the present. They have included major studies by outside consultants including Mercer Management (1998), Halcrow (2000), and AD Little (2003), as well as a number of government and/or Spoornet studies. The most recent study and proposal, to be discussed in detail below, is in the NFLS.

The various studies have covered a wide range of options, from essentially no change (but of course with more money) to proposals to privatize the OreEx line and the CoalEx line and to trim back the GFB system to varying levels of a “core” system. All proposals for change, especially private sector involvement and/or system trimming, generated opposition, particularly from labor. The extant policy, articulated in a 2002 Shareholder (Government) pronouncement, was to keep the railway system under Spoornet control with the exception of the passenger services that were to be transferred to government responsibility. In addition, the branch line system was to be studied for possible change (apparently partly done) and about 8000 jobs were to be retrenched by 2006 (this was about half accomplished). Based on this structure, appropriate capital budgets were to be formulated and implemented (plans were formulated but not fully funded).

The passenger service separation and transfer were formulated and are apparently agreed. Implementation, though slower than expected, is proceeding and should be completed in 2007. Other than this important initiative on the passenger side, however, structural change in the freight side of Spoornet has been stymied and Transnet’s current plans for Spoornet are essentially focused on repairing the deficit in capital investment and upgrading management under essentially the current structure.

The reasons for the lack of change, despite Spoornet’s past unsatisfactory performance and its increasingly outdated organizational structure, are not entirely obvious. The most important reason is surely the lack of a clearly articulated and consistent set of objectives for the railway as a whole. Spoornet has been exhorted to be “commercial” but has also faced opposition when it tried to cut expenses through labor force reductions or abandonment of uneconomic lines. Government would like to see more traffic shifted from road to rail, but inefficient operations and limited infrastructure capability (especially low axle loads on railways and lack of enforcement of the highway axle load regulation) make such a shift unlikely. In addition, there is no single agency charged with formulating a new structure and making it happen. The Department of

Transport (DOT) has articulated a number of reform strategies over the years, only to see them stall. The Department of Public Enterprises (DPE) in principle has the authority, as the spokesperson for the “Shareholder,” to instruct Transnet (and through it Spoornet) to formulate and implement changes in structure. Both of these agencies have a remit to define and act in the broader public interest. Transnet, as a large public enterprise, has naturally sought to maximize its own standing, which has been based on a mixture of commercial and political objectives. Under these circumstances, the *status quo* tends to win.

The current structure of Spoornet is, with the exception of the (desirable) shift of passenger responsibilities entirely to government, effectively a monolith in public ownership and, in principle, subject to political control through DPE and then Transnet. Despite the identification of the three lines of business, there is not actually any reliable information available to the general public about the revenues and costs of these businesses, nor is there any fully transparent reporting in an international format that clearly defines the performance of Spoornet as a freestanding entity. Interviews with Transnet management suggested that the existing methods of cost allocation in Spoornet (SCAP) are such that management has limited confidence in the internal profitability analyses that Spoornet conducts, nor is management convinced that Spoornet has the attitude or incentives to act commercially.¹⁰

The dimensions in railway reform

In broad terms, four issues should be addressed in railway reforms: competition, structure, regulation and ownership.

Competition

Competition in transport – specifically for railways – is manifested in a number of ways, depending on a wide number of economic variables. Competition in freight markets can be seen either as inter-modal competition or intra-modal competition.

Inter-modal freight competition, competition between rail and trucks, or rail and water, is a powerful force in South Africa, as it is in many countries. Depending on the commodity to be shipped and the distance traveled, a different balance among the available modes will emerge. For example, in the U.S., about 40 percent of surface tonne-km is carried by rail. By comparison, rail carries roughly 37 percent of surface tonne-km in South Africa as compared with 85 percent in Russia and 15 percent in the E.U.

Intra-modal competition – competition between two or more railways for the same markets – has been much less common. In the past, essentially only the U.S. and Canada have had rail versus rail competition. In the U.S. and Canada, intra-rail competition has mostly been between parallel lines operated as integrated systems, though there has been some competition on the same line through voluntary negotiation (or regulatory imposition) of “trackage” rights under

¹⁰ Interview with Mr. L van Niekerk, Chief Operating Officer of Transnet. Mr. van Niekerk believes, however, that cost allocation efforts are improving.

which one railway has the ability to operate over the tracks of another under specified rights and in return for a trackage use fee. As discussed below, the E.U. has promulgated rules under which infrastructure must be distinguished from passenger and freight operations, and any interested operator would be able to compete with other operators in return for non-discriminatory access and payment of an access charge.¹¹

Competition **for** freight (and passenger) markets has become common in the past two decades in the form of competitively awarded concessions or franchises. At the beginning of the 1990s, all significant railways in Latin America were owned and operated by national governments. Over the decade of the 1990s, the major railways in Argentina, Bolivia, Brazil, Chile¹², Mexico and Peru were divided into appropriate parts and offered in concession to the private sector. A similar process has taken place in Africa in Cote d'Ivoire/Burkina Faso, Senegal/Mali and Malawi, as well as more recent and less defined concessioning in Gabon, Zambia, Tanzania, Madagascar and Mozambique. Spoornet was actually a partner in several of the African and Latin American concessions, so is presumably aware of the experience and how it might be applied to Spoornet, itself.

There is also emerging experience in the E.U. with passenger rail franchising as well as freight separation and sale of operating rights. The most well known case (perhaps "notorious" would be a better word) was the breakup and total privatization of the old British Railways. In this case, the Government created an infrastructure company (Railtrack), 25 passenger franchises, three rolling stock leasing companies (ROSCOs) and several freight companies. The infrastructure, rolling stock and freight companies were privatized outright: the passenger franchises were awarded through competitive bids (**for** the market) on the basis of maximum payment to, or minimum payment from, government. Some aspects of the British approach were relatively successful (passenger and freight demand have grown rapidly to the point of system congestion) and some (notably Railtrack) failed. By contrast, a number of other E.U. countries (Sweden, Germany and the Netherlands) have taken a more cautious approach to passenger franchising, with some degree of success. Australia also broke up its rail system into a number of infrastructure and operating companies some of which were subjected to competition for

¹¹ See, for example, ECMT, "Railway Reform and Charges for the Use of Infrastructure," Paris, 2005, for a detailed discussion of the history and issues in the E.U.'s access policy.

¹² The railway in Chile was separated into an infrastructure company that remained in public hands and management and a freight operating concession that was awarded to the private sector, while passenger services continued to be operated by public agencies. Other than Chile, freight and passenger concessions were exclusive: that is, no competition was expected on the same tracks or, indeed, in the same geographic markets.

franchise or operating rights, some of which (especially the freight companies) were successful, others (Sydney suburban) less so.¹³

To date, South Africa has essentially chosen not to promote intra-rail competition nor, in any significant way, to promote competition **for** any rail markets. In practice, this has meant that the GFB markets face stiff trucking competition; OreEx and CoalEx are, because of volume and distance, not subject to significant competition (though they could be competitively awarded to develop competition **for** their markets, if not **in** their markets).

Structure

Railway structure also offers a number of options, both in the degree of integration of infrastructure and operations, and in the balance of ownership between public and private sectors. Figure 11 displays the structural and ownership options.

Railways originally were operated as “monoliths,” in which the same company controlled both the right of way and all operations (freight and passenger). In addition, the same company usually controlled all rolling stock ownership and maintenance. This model with full public ownership and control essentially prevailed on most railways through the 1970s. It still prevails in China and India.¹⁴

The second structural option is one in which the dominant operator still controls the infrastructure, but sub-dominant operators are allowed access to the infrastructure under specified (and usually limited) terms and conditions for a fee. The tenant operator can either be a non-competing operator (such as passenger trains on the freight network, as is the case with Amtrak in the U.S., VIA in Canada, and as will be the case with Shosolozza Meyl in South Africa) or can be a competing operator, as with the freight trackage rights in the U.S. Canada has a similar provision (thus far little used) in which one freight company can demand limited access over the tracks of another.

The third structural option is one in which the infrastructure is, in principle, totally separated from all operators, with all operators being allowed non-discriminatory access and paying access charges that are supposed to promote efficient use of the infrastructure. The degree of separation of infrastructure from operations varies from what is essentially accounting separation (Germany and France) to full institutional separation (U.K., Sweden and The Netherlands) where there is no ownership or control linkage between infrastructure and

¹³ There have been a large number of studies on the experience with concessioning and franchising, reaching disparate conclusions. See, for example, Thompson 2004 (World Bank) for a discussion of the specifically BR issues. See Williams, Greig and Wallace 2005 (World Bank) for a discussion of the issues and results in Australia and New Zealand. A recent survey and assessment of the EU experience, including BR, can be found in ECMT 2007, “Competitive Tendering of Rail Services” This report surveys a number of reports on the E.U. and worldwide experience, all of which may be of interest in South Africa.

¹⁴ Even Indian Railways is not totally public: there is actually some private investment in the Indian Railway Container Corporation.

operations. The requirement for vertical separation of infrastructure from all operators is the current E.U. model. Versions of infrastructure separation have also been adopted in Australia and Chile.

The second ownership option offers a number of mixed ownership choices, generally (but not always) with infrastructure still publicly owned, but with one or more of the operators operated as tenants by an owner or owners separate from the infrastructure owner. This describes the franchising approach in Germany and Sweden, for example.

The third ownership option is full privatization of infrastructure and operators. This is the situation with a number of mining railways in the U.S. and Australia and, interestingly, a number of smaller passenger railways in Germany.

As Figure 11 illustrates, the product of three structural approaches and three ownership options is actually a nine-cell matrix. More important, there are examples in each cell: that is, there are cases around the world that illustrate all of the potential combinations. The critical point is that railways are not, should not be, either/or propositions of all public or all private; there are places between the upper left and the lower right of the matrix. In fact, the best approach is often a mixture of structures and ownership – one of the seven other cells of the matrix. By contrast, though there has been discussion of structural and ownership alternatives, SpoorNet is currently an example of the monolith in public hands.

Choosing among the cells is based on a number of factors, of course, but management incentives may be the most important. Institutional change, by making various types of **competition** possible, can have a powerful impact on management attitudes and objectives: there is probably no force stronger than competition to make management focus on revenue generation, cost efficiency and proper acquisition and deployment of scarce investment funds. Monopolies may appear to be “efficient” in an engineering or “coordination” sense, but they clearly do not feel the same pressures to manage and invest wisely (as the experience with Transnet demonstrates). Ownership changes also affect incentives. It can be argued that public enterprises are more directly responsive to the public interest or, more accurately, to political pressure. Private enterprises, however, are beyond argument more aligned to market forces and, lacking unclear and mixed objectives, and bureaucratic controls, can respond much more quickly to market needs. This is not to say that any of the cells is necessarily the best approach everywhere: but, the behavior of management will be quite different in each cell. This is one of the crucial factors to be taken into account when choosing among possible paths of reform.

Regulation

In market economies, the concept of **economic** regulation developed because there are some activities that are thought to be natural monopolies and not subject to competition in the market. At the same time, monopolists are not trusted to set their own prices or services because a monopolist's price would be too high and economically inefficient. Economic regulation is the *quid pro quo* of natural monopoly. Railways (or, at least, railway tracks) have long been used as the classical examples of a natural monopoly: conversely, the classic defense of a publicly

owned railway monopoly is that such control is necessary to ensure that the monopolist acts in the public interest. In the U.S., for example, railways were thought to have market power, and thus to need close regulation. By contrast, in most of the E.U., railways have no market power in the freight markets, and face no freight tariff regulation at all.

Regulation of the **safety** practices of many sectors, especially railways, has also been considered to be a necessary role of the public sector because the benefits and costs of safety (especially the safety of passengers and the general population) are often considered to be external to the railway itself. This argument has been used with particular force when the railway has been private and thus presumably profit driven rather than motivated by the public interest. In most cases, the logic of the argument has also ensured that the regulator, again especially the safety regulator, is clearly separated from any pressure from the railway itself so that safety issues can be raised and settled without being subsumed within the railway's other concerns.

At present, Spoornet, like Transnet, is essentially unregulated, an unusual position for a monopolist to be in. Unlike most market economies, although Spoornet clearly has market power in at least some of its markets, and is not subject to effective competition in other markets, there are no procedures in place for a regulator to assess whether tariffs are too high, or whether Spoornet is adequately serving its customers, nor is there accurate information available either to the public or within Spoornet to measure costs, revenues or competitiveness.

The latter point deserves emphasis. In principle, DPE could, through its control over the appointments to the Transnet Board of Directors and through voting the "Shareholder's" shares, serve in the place of a regulator. In practice, however, there are no enunciated and agreed criteria for tariff regulation of Spoornet (or Transnet)¹⁵, nor is there any accurate and reliable information available to DPE (or any other potential regulator) for use in measuring performance against such criteria.

South Africa is not necessarily unusual in this regard. The European Commission has erected an elaborate framework of regulations for enforcing the infrastructure separation and non-discriminatory access rules it has promulgated. At the same time, the Commission has not yet mandated the collection and public reporting of the information needed to enforce its regulations. Instead, it has left this task to the Member States – with limited success, though

¹⁵ In the U.S., for example, a series of presumptions are created under which a railway's market power, and potential abuse thereof, can be measured. For example, if a railway's overall earnings are not adequate (i.e. earnings do not cover its cost of capital), then it is given great leeway in its pricing. Unless a railway's tariff can be shown to be greater than 180 percent of the variable cost of the traffic covered under the tariff, abuse of market power does not exist. In addition, railways are permitted to negotiate contracts with shippers that are not subject to publication or regulation. Of course, these might not be the appropriate criteria for South Africa. The point is, though, that they are well defined and the data exist to analyze their performance and are made available **to the public** (not just the regulator or the potentially protesting shipper).

some progress is slowly being made.¹⁶ Because rail freight transport is more important in South Africa (Spoornet carries 37 percent of surface tonne-km) than in the E.U. (railways carry at most 15 percent of surface tonne-km) the potential import of the lack of information is greater.

To recapitulate, the options for competition, structure and regulation are extensive, and there is no exclusive combination that works best in all circumstances. In fact, countries have legitimately adopted quite different approaches depending on the transport sector conditions of the country, on budgetary circumstances, and on local cultural and political values that determine the priority of social objectives and the desired balance of activity and investment between the public and private sector. Even at the railway level (much less the level of common ownership and control of the rail, ports and pipelines – to be discussed later), fewer and fewer market oriented countries are continuing a model that permits a monolithic freight railway, under full public ownership and control, in possession of significant market power but without effective public information about performance in support of economic regulation, and with safety regulation under the effective control of the operator. It seems reasonable to argue that at least some of the dissatisfaction that the DOT and SAICE have expressed with SpoorNet's performance could indeed be attributed to a sectoral structure that is more and more out of date and unsuited to meet the challenges of a dynamic and growing South African economy. Possibly a different structure would permit SpoorNet's grades to be better than a B for the OreEx and CoalEx lines, a C for the GFB lines, an E (!) for the uneconomical general freight lines and a D+ for passenger lines. Equally clearly, a significant portion of the dissatisfaction expressed by shippers comes from the same source.

Choices For SpoorNet's Structure

On information and objectives

As discussed above, while there may be no cookbook formula for the best railway structure in any particular country, it is also clear that there **are always choices**: the *status quo* is **never** the only available option. More important, it deserves restating that choices among structural alternatives **matter**: each of the choices will have advantages and disadvantages, and the system will perform differently depending on the structure chosen. The choices are not at all randomly made, and the stakes are high for South Africa.

A related observation is that SpoorNet is more and more becoming **doubly** opaque. Information that SpoorNet routinely used to publish (the Annual Divisional Report, for example, however valid it might have been in an accounting sense) will no longer be published. Instead SpoorNet data will be reported in a summary way that will make analysis of SpoorNet as a freestanding entity impossible. In addition (as discussed in more detail later), Transnet itself is reporting its results in a way that make meaningful regulatory analysis of its various activities less and less feasible. It is possible that DPE and DOT have all of the relevant information but, even if they do (interviews suggest that they do not), the public is denied them. If there is to be no open

¹⁶ See OECD, "Public Accounting and Asset Quality Data: Reporting Requirements for Effective Regulation of Rail Infrastructure," Paris, 2006.

regulation then, absent meaningful public input, how will the public hold DPE and DOT responsible for their stewardship? Under current conditions, informed debate, analysis and public feedback are precluded.

In parallel with the clear need for more relevant and detailed information, available to the public, is the need to clarify Spoornet's (and Transnet's) **objectives**. Interviews with all parties suggest that Spoornet management is faced with a large number of diverse and often conflicting objectives. They should act "commercially" (which means maximizing prices and revenues while minimizing costs in a way that maximizes the net income of the company); they should offer service on uneconomic branch lines for social reasons; (in the past, at least) they had to offer passenger service at a loss; they are supposed to use their scarce investment funds in the most effective way (highest rate of return) but, at the same time, maintain locomotives and track for use inefficiently and unprofitably on the GFB system; they are supposed to employ "profits" generated on one part of the system to support socially desired services on the rest of the system; they are supposed to support a number of socially and culturally desirable programs without explicit compensation; and, Spoornet is supposed to capture an increasing share of traffic from the highway (for social reasons) using infrastructure and rolling stock that meet inadequate standards and are poorly maintained, while at the same time subsidizing socially (or politically) favored shippers. This is not at all to say that these objectives individually might not be meritorious: instead, it is to emphasize that they cannot all be done simultaneously without causing management confusion. In addition, the performance of management that faces conflicting objectives cannot be evaluated fairly (or at all).

A particularly important issue (that arises also at the Transnet level) is the policy of imposed cross subsidies. That is, Spoornet is supposed to use the "profits" on the OreEx and CoalEx lines to support the needs of the GFB system (as they were also required to do for the passenger services), and, more broadly, Transnet is supposed to use earnings generated in ports and pipelines to support rail investment. It is, in other words, **the responsibility of an SOE to support the State**, and not the other way around. The net result is that South Africa's exports of coal and iron ore are paying higher prices for transport (and/or port services) than they would otherwise have to pay, which means that the U.S., Canada, Brazil and Australia are in a stronger competitive position than they would otherwise be. It is also clear that South Africans are paying more for rail-based imports than is necessary. In both cases, the cost of the policy is a lowering of the very international competitiveness that South Africa is seeking so strongly to promote.

A particular problem of cross subsidies, when they are imposed on a "commercial" SOE that actually has to compete with private competitors (trucking, in the case of Spoornet), is the destruction of commercial behavior. When an SOE (or an over-regulated private company) has to provide a losing social service, two things inevitably happen; 1) the SOE does a poor job of its "profitable" service because the profits it should be reinvesting are being drained away by the losing activity; and, 2) it does a poor job of providing the social service because its profits elsewhere are never enough to pay for the losses on the social service and because it is inherently harder to find committed and creative managers for a service that has unclear or conflicting objectives and is seen as "losing." South Africa has already gone through this debate

during the creation of SARCC and Shosolozza Meyl and has resolved it, correctly, by opting for separate management¹⁷ and direct support. But passenger services are simply **not** the only example of the issue: the GFB system raises exactly the same problems and for the same reasons.

The discussion below will perforce make some assumptions about what South African objectives might be, based on international experience. In the longer run, though, there will be no substitute for a more open discussion and agreement in South Africa as to what the commercial and social objectives of Spoornet and Transnet ought to be. This should be accompanied by a more explicit approach to defining the costs of the social activities and a way of paying for them that does not have the effect of either taxing shippers that operate in international trade (harming South Africa's competitiveness) or artificially raising Spoornet's costs, thereby shifting traffic to competitors (trucks) and defeating the government's objective of shifting traffic from highway to rail. This is not intended to say exactly how the discussion should conclude; that is a South African decision. Instead, it is to argue that objectives need to be consistent and agreed, or none will be achieved effectively. Moreover, the architectural truism, form follows function, applies also to railway structure. It is impossible to organize and manage effectively if the objectives are unclear or in conflict.

Avoiding radical change

Spoornet, like all railways, is resistant to change. This appears to be reinforced by Spoornet's submergence within Transnet, which serves to make the barrier to change even higher. The history of discussion of changes in Spoornet's structure in South Africa makes it clear that radical proposals for change tend to accomplish little. This may especially be the case when such proposals come from external consultants.

This paper will take a less radical, more incremental approach. More important, the paper argues that there is no need for outside intervention: choices already on the table in South Africa, **wholly from South African sources**, are sufficient to inform the issue. Instead, the paper will summarize these proposals, try to list their advantages and disadvantages within the objectives that appear to be relevant (allowing, of course, for clarification of the proposed objectives) and suggesting ways in which the extant proposals could be made to work better.

The ensuing discussion makes the assumption that the issue of passenger service has been decided and will be implemented as planned. Shosolozza Meyl will be separated from Transnet and Spoornet, and will be operated as a freestanding entity fully supported by government. Any relationships between Shosolozza Meyl (rolling stock maintenance, track maintenance, track

¹⁷ Relevant to the ensuing discussion is the fact that most governments, when faced with the need to subsidize an activity directly, tend to opt for an institutional separation (separate management) both to focus management attention on the supported service and, probably more important, in order to separate the accounts so that government is actually getting what it pays for, and not paying for opaque allocations of overhead costs. Accounting separations of costs are rarely satisfactory: when governments have to pay, they usually want more reliable information to document costs and performance.

access fees) will be handled on a commercial and arms length basis. This is fully in accord with international practice, and should be implemented as soon as is feasible.

Choices on the table

At the risk of some simplification, there appear to be two broad approaches on the table, a Transnet/Spoornet proposal and the ideas contained in the National Freight Logistics Strategy (NFLS).

The **Transnet/Spoornet proposal** would essentially retain the existing freight structure. That is, Spoornet would remain a unitary entity under the Transnet umbrella, along with NPA, SAPO and Petronet. Transnet has announced a four-point turnaround plan in order to rectify a number of past and current problems. “The turnaround plan is **internally** focused and programme driven, reflecting the current reality that Transnet **firstly needs to develop itself and ensure its financial sustainability before** assuming a leadership role in the South African freight logistics system.”¹⁸ [emphasis added] Transnet proposes to rectify the past neglect in maintenance and replacement through a five year capital expenditure plan of Rand 68.4 billion, or which Rand 31.5 billion would go to Spoornet (primarily for rolling stock), Rand 18.6 billion to NPA, Rand 6.2 billion for SAPO, Rand 4.9 billion to Petronet, Rand 2.6 billion to Transwerk (which mostly maintains Spoornet rolling stock), and the remaining Rand 4.6 billion going to corporate and non-core activities.¹⁹

A part of the Four-point turnaround plan does include spinning off some non-core businesses, and there is acknowledgment of the need for a continuing assessment of the Spoornet branch line system. Transnet also puts emphasis in the plan on re-engineering core businesses and developing a customer focus. In addition, Transnet has participated in a number of DOT discussions about Spoornet structure, and has suggested that it might support some of the ideas in the NFLS proposal discussed below. With this said, the Transnet approach emphasizes working with the current structure, and rectifying the lack of managerial focus and capital neglect resulting from the “sins of the past.” It is, as the statement quoted above emphasizes, explicitly focused on **Transnet’s** internal needs, leaving concerns about Transnet’s or Spoornet’s potential role in improving South African logistics to the point, presumably five years in the future, when the turnaround plan has been implemented. The underlying philosophy clearly is that the problems of the past were caused by neglect (cause not specified) and a lack of managerial focus (source unspecified) that can be rectified by more investment (generated from earnings that have not sufficed in the past) and limited internal corporate re-engineering.

DOT’s NFLS proposal starts from the argument that the current freight transport system in South Africa is not working as well as it should and that this malfunction is limiting South Africa’s growth and participation in international markets. It is worthwhile quoting at length from the NFLS, because it defines the issues (from DOT’s point of view) in a clear and compelling way.

¹⁸ Transnet Corporate Plan 2007/2007, page 17.

¹⁹ Transnet Corporate Plan 2006/2007, page 20.

“The National Freight Logistics Strategy [NFLS] is a response to the freight system’s inability to fulfill the demand for cargo movement at prices, levels of service, quality of service, and at acceptable levels of reliability in a manner that supports the national developmental strategies. This failure stems from an **inappropriate institutional and regulatory structure** that does not punish **inefficiency** and reward **efficiency**. It is structurally incapable of allocating external costs and raising efficiency. Although elements of the system, such as the national road network, are of a high standard and even surpass those found in some developed economies, it is the system-level performance and state of infrastructure that need attention.”²⁰ [emphasis added]

The problem statement is succinct: “The freight system in South Africa is fraught with **inefficiencies** at system and firm levels. There are infrastructure shortfalls and mismatches; the **institutional structure of the freight sector is inappropriate** ... and the **regulatory frameworks are incapable of resolving problems** in the industry. **The impact of this is severe**” (NFLS, page ii) [emphasis added]

Later on the same page, the NFLS goes on to say, “These infrastructure operators need to be sufficiently **separated from operators to allow the introduction of competition in operations** in the public owned and operated infrastructure. This must be accomplished by the **creation of a space for private sector involvement** in ownership, funding and operation of infrastructure.” [emphasis added]

Because of the importance of the NFLS report, a few additional quotations will be helpful:

From page 3, “South Africa’s geographic position, relative to global routes, is a disadvantage in itself. It is therefore important that the transport system support South African products/goods and services in order for them to be and remain competitive in global markets...” South Africa cannot afford an inefficient transport system

From page 3, “In the light of the ... challenge posed by geographic position, South African products that move in the hinterland face a difficult challenge in terms of the inefficiencies of our ports and rail environment.”

From page 4, “In the rail sector, for example, management should change its rigid approach to rail service, which places customers at the end of a supply driven strategy and service-delivery ethos and thus undermines their responsiveness to their clients and results in lost business.”

From page 5, inefficiencies result from (among other things), “rigid costing approaches that are not customized. Costing methods used to develop and set tariffs are rigid and are not activity-based. If we are to reduce the cost of doing business, there should be a reform of the tariff setting regime in both the ports and rail sectors.”

²⁰ NFLS, page ii. The report, at page 3, specifically identifies “... inefficiencies in our **ports and rail** environment” as the inefficiencies of concern. [emphasis added]

From page 5, “In the rail sector, for example, the majority of investment in infrastructure upgrades, maintenance and network capacity expansion, is targeted at the higher revenue and dedicated customer lines that almost invariably service big business and the first economy. Only about 1% of rail investment planned over the next 5 years is earmarked for branch lines, the part of the rail network that best links up the first and second economies. This ‘commercial’ approach is exacerbated by the desire in SOEs to classify all economic developmental infrastructure as the responsibility of Government, to be transferred to the direct control of the state, while wishing to retain commercially sustainable infrastructure to extract monopoly rents from the transport operators and cargo owners.”

From page 6, “The existence of operations entities within the same holding company as the infrastructure companies exacerbates perverse behavior and pricing further, while transfer pricing entrenches the inability to introduce competition in the medium and long term without radical shifts in regulatory and industrial restructuring leadership from the state.”

From page 7, “Over the past two decades, the South African economy has shifted from a primarily inward focused economy, which uses import substitution..., to a manufacturing and service economy with an increasingly high export orientation.”

From page 8, when discussing the role of SOEs in transport, “Rail - Transnet develops rail policy (by default, due to its dominance), conducts economic and safety regulation, provides and maintains infrastructure, and is also responsible for freight transport operations.” As to ports, “Ports – The National Ports Authority (NPA) is responsible for the development and maintenance of port infrastructure, while the South African Port Operations (SAPO) is responsible for cargo movement operations at ports. Economic and safety regulation at the ports is solely administered by the agencies themselves...”

From page 9, “Our infrastructure is inappropriate to the development path of our country, and needs to be revamped in order to prevent the perpetuation of our existing problems. Furthermore, our regulatory regime has not been adequate to constrain the pricing of monopoly infrastructure entities. The infrastructure monopolies have extracted high margins from the movement of cargo, without ensuring sustainable levels of re-investment. These profits have tended to be used to subsidise inefficient operations and loss making components in other areas of the transport and logistics sector, rather than raising our capacity over time.”

From page 24 (for reference later in this paper), “The overarching issues facing the port[s] are mainly related to the industry structure and regulatory framework.”

From page 28, in summary, “The quality of infrastructure in the freight logistics sector is insufficient to sustain a world class logistics system. The operations on the infrastructure is (sic) further, not targeted at fulfilling demand, but rather at tailoring demand around the supply structures and constraints.”

In very direct terms, the NFLS is saying: first, the transport system in South Africa is not working well and its shortcomings severely impact the country’s ability to implement national

development strategies; second, a significant cause of the problem is the system **structure**, which can be rectified by creation of appropriate competition on state-owned infrastructure and opening the door to at least some degree of private participation; third, the entire policy-making and regulatory function has been sub-contracted (abdicated might be a better word) from government to the SOE level (where the national interest and the enterprise interests conflict directly); and, fourth, the regulatory system is currently ineffective at promoting competition and efficiency, and will need to be modified to fit the evolving structure. Moreover, the report clearly argues that transport efficiency should be a high priority goal along with, of course, other economic and social goals of South Africa. This is certainly **not** a *status quo* prescription.

The principles for reform in the NFLS are broad, but can be summarized in the following points: 1) the vision is for the government to retain the majority ownership of critical infrastructure and to remain responsible for network development and management; 2) government may involve the private sector under the right conditions, but this should be the exception rather than the rule (interestingly, the NFLS argues by implication that the existing private operator in the port of Richards Bay should be publicly owned because private operation “prevents the utilization of the terminal” – page 39); 3) cross subsidies should be used so that charges to commercial operators for use of infrastructure can be used to support infrastructure that is non-commercial, but still in the public interest; 4) infrastructure can be managed (as opposed to owned) by government, an SOE, or the private sector, with public operation the default option; 5) private operators on the public infrastructure can be promoted, especially when they create competition on the infrastructure; and, 6) the currently fragmented (and captured) regulatory approach should be replaced with three regulators (economic, safety and environment, and security), each of which would have a transport-wide purview.

These principles, along with the findings discussed above, furnish a reasonably consistent starting place from which to develop and evaluate reform proposals. The exception – the idea of an explicit policy of cross subsidies from intensely used to lightly used infrastructure supported by access charges to commercial operators – may contradict or negate many of the other principles. The proposal probably reflects a remnant of the aversion to clearly accepting, and paying for, the impact of socially imposed burdens on otherwise “commercial” operators. The proposal also reflects a lingering conflict in the vision of the proper role of an SOE based on a continuing expectation that SOEs (unlike private enterprises) can somehow simultaneously be “commercial”, competitive and “socially responsible”. The issue certainly deserves a fuller debate as the ideas of reform are developed.

The NFLS then uses the rail system as the example of how the principles might be implemented, although the ideas are advanced as concepts for discussion, not as a finished program. The discussion of the structural ideas can be found on pages 49-53. The approach can be summarized as follows:

1. The existing network would be split between a “primary” and a “secondary” network (illustrated in Figure 7). Although the general idea is that the primary network would be the high density network and the secondary network would be lighter density, the NFLS appears to envision designing the two networks so that they will not end up as a “profitable”

network that access charges could pay for versus a “social” network that would end up as a ward of government.

2. The primary network would be “owned and operated by Spoornet.” Note that this applies to the **network** and, as discussed below, not necessarily to all **operations** on the network.
3. The secondary network would be owned and operated by a new “rail utility” but “socio-economic responsibilities” would “also be performed by Spoornet.” The meaning of “socio-economic responsibilities” is not clarified, and could be a significant item to be refined. Again, this issue relates to the need to develop a consistent version of what an SOE can and should do if it is also expected to operate efficiently in a commercial market in competition with competitors that do not have the same “social” expectations.
4. Both public and private operators would be permitted on an open access basis on the **secondary** network. This would apparently set up a situation similar to the U.S. Short Line system where small, former branch lines of the Class I railroads are sold to and operated by small companies that collect the traffic on the lines and interchange it with the Class I railroads at the junction point. In the South African context, this would be an excellent opening for small, private (or local government) operators to ensure service to small communities that the more rigid and higher cost structure of Spoornet would not support. The key question for the open access system secondary system will be the principles on which access charges are determined.
5. Public and private operators would be permitted on the primary system, presumably in competition with the Spoornet operator, on a non-discriminatory basis, but on restricted access terms to be determined by the Minister of Transport (“[t]he level, pricing and routes for access to the primary network will be decided by the Minister of Transport and periodically adjusted on the basis of impact on the traffic levels, sustainability of services and network complexity issues.” (NFLS, page 50). In principle, this might include limited, preferential access by the secondary operators in order to provide better connections to shippers on the primary network.

The Transnet and NFLS approaches are compared in Figure 12.

Some expert suggestions

In general, the NFLS proposals deserve serious consideration as a place to start reform. Below are a series of suggestions that might be included in the reform process of Spoornet as (if) it proceeds. As emphasized in the “angels fear to tread” section above, these are advanced in full realization of the fact that outside experts can never fully understand South African objectives and values. Fortunately, in this case, the basis of the approach (the NFLS proposal) is South African, so the suggestions are offered as an attempt to add to what is already on the table from internal sources.

1. The key to any further reform will be **better, and public, information** about railways in South Africa. This suggests that there should be a clear accounting separation for Spoornet as soon as possible (it could start with continuing issue of the Divisional Annual Reports) using activity-based reporting so that the real performance of Spoornet (now) and all railways (later) can be validly measured and evaluated. The DOT (and, eventually, the new

regulator) might consider the reporting format required in the Statistics of Class I Railroads in the U.S. (privately owned), including waybill reporting, as a place to start, although no doubt this report could be simplified in the South African context. Another source of an example of public statistics could be the International Railway Union's (UIC) International Railway Statistics.²¹ The public regulatory reporting structures in Argentina and Brazil are relevant, also, as was the reporting structure for Sitarail in Cote d'Ivoire and Burkina Faso. All of these systems provide at least broadly indicative measures of performance. By contrast, the lack of information reported by the railway concessions in Mexico and Peru furnishes no basis for public analysis. No matter what happens with SpoorNet structure, better and more detailed public reporting of essential information on at least an accounting basis showing lines of business will be critical to further reform progress.

2. Safety regulation should be separated as planned from SpoorNet as soon as possible, and the regulator given resources adequate to the job. Examples of independent safety regulators (U.S. and U.K.) are available. Each has strengths and weaknesses, but essentially all significant safety regulators in market economies are independent of the agencies they regulate.
3. The proposal to separate the network into primary and secondary networks is, in principle, a good approach. In general, the existing "high density" network concept is probably a good starting place for the primary network – OreEx, CoalEx, connections from Gauteng to Cape Town, Durban, East London, Port Elizabeth/Ngqura, and the essential connections to other countries. Translating this into a coherent primary network, and a secondary network that is also coherent, will not be simple. DOT and DPE should form a team to define the principles and objectives to be used in designing the two networks, and then work with SpoorNet to carry out the design. Network design is the *sine qua non* of further reform on the primary/secondary model. Much work on this question has already been done, and the information and techniques for designing the system already exist.
4. Along with network design, the principles of the access charging must be worked out. As a general principle, a version of the E.U. approach, where access to the secondary network would be based on single-part, marginal cost charges; whereas access to the primary network based on a non-discriminatory markup over marginal cost would be a place to start. In addition, as is the case in Germany and France, for example, access charges on the primary network (if instituted) could differ according to the specific line: charges for the OreEx line could be different from the CoalEx line, and they could both be different from other lines in the primary network. Moreover, access charges to the OreEx line and the CoalEx line could be two-part systems whereas the access charges to the rest of the primary network should almost certainly be single-part systems.²² Great care needs to be exercised on the idea of cross-subsidizing from the primary to the secondary network. There is a real danger that the current abuse of cross subsidy in the existing system could

²¹ SpoorNet currently reports only a limited amount of information to the UIC. If SpoorNet reported all the information required in the International Railway Statistics, as most E.U. railways do, the result would be highly useful. Presumably it would not be an unreasonable burden on SpoorNet to meet the same reporting standards that many other railways already meet.

²² See, for example, ECMT 2005 for a much more detailed discussion of these concepts and how they have been applied (and misapplied) in the E.U. countries.

simply be replicated in the access charges. With this acknowledged, a proper set of “mark-ups” in the primary network access charges might permit some surplus to be generated that could be applied to the fixed costs of the secondary network.

5. The idea of open access to the secondary network – so long as the access charges are based on marginal costs – may well offer real benefits. This could be a way to foster small businesses that are focused on serving local needs at very low cost, along the lines of the U.S. Short Line railroads. It is important, however, to realize that the economics of the U.S. Short Line railroads are for the most part based on relatively high tariffs and, critically, freedom from labor rigidities and costs that the Class I railroads are subject to. Any attempt to require that operators on the secondary network offer exactly the same tariffs or working conditions as Spoornet is likely to ensure that there are no local operators (private or public). This means that labor interests will have to be deeply involved in the formulation of the scope and working conditions of the secondary system.
6. At least some of the secondary network infrastructure might be offered to private owners or to local authorities. If these parts of the network are truly uneconomic and have no national significance, there is no apparent reason why they should not be offered to others, certainly as an alternative to being pulled up. In addition, the utility owning the secondary network might also consider creating a “land bank” of branch lines that, though they do not justify current operation, may well be needed in future. The land bank might include actual lines that would be maintained in some minimal status or might include just the right of way in case lines might be put back in future (of course, the right of way would have to be kept clear of settlers, even if not in use).
7. By contrast, the idea of significant open and competitive access to the primary network should be pursued with considerable caution. Operations (even integrated with infrastructure control but **not** necessarily ownership) on the OreEx and/or CoalEx lines might well be candidates for concession-type competition (competition **for** the markets) in a way that would yield payments to government that could be used to support the rest of the system (freight concession payments in Argentina, Brazil and Mexico, for example, were substantially positive). Beyond these lines, however, the remainder of the primary network may be in the uncomfortable position of having too little traffic to support competition but too much traffic to allow free access. In addition, licensing new operators, especially on the primary network, will be an important and difficult issue to resolve (particularly because opposition in the licensing application process becomes another way for existing operators to try to maintain their exclusivity).
8. If reform proceeds as suggested, then government may want to require the spin off of Transwerk. The U.K. Government created three Rolling Stock Companies (ROSCOs) that were separated and privatized in order to ensure that the passenger franchises would continue to have competitive access to rolling stock. It will not be sufficient merely to create the possibility of leasing for the competing operators on the secondary network if the access to effective maintenance of rolling stock is controlled by Transnet. In addition, spin off of Transwerk would ensure neutral access to maintenance services for all operators including Shosolozza Meyl.
9. The apparent insistence of Spoornet on owning all their rolling stock is puzzling. U.S. and Canadian practice is more and more toward shipper or lessor ownership of freight wagons and, to a limited extent, of locomotives. In 2005, for example, only 36 percent of the freight

wagons on the U.S. network were owned by the U.S. Class I railroads, with the remainder owned by smaller railroads, leasing companies and shippers. In particular, wagons used in unit (block) train service for specific shippers are often shipper-owned (or leased) because this ensures the shipper a controlled, high quality and fully adequate supply of wagons to meet the shipper's specific needs: at the same time, the railway can use its scarce capital resources for more general, system-wide needs. Given that well more than half of the Spoornet capital program is in rolling stock rehabilitation (wagons that could be sold, repaired and leased-back) and new freight wagons, the opportunity of more private investment in wagons and even locomotives should be thoroughly explored so that the funding released could be employed for other purposes.

10. At least at the outset, the infrastructure utility owning the secondary network should contract with Spoornet for track maintenance (unless the track maintenance function from Spoornet is also spun off).²³ In the longer term future, as the utility owner of the secondary network gains experience, other agencies (SANRAL, for example) or private contracts might be invited to compete for railway infrastructure maintenance work.

The Broader Issues of Transnet

The initial question is whether the totally unitary and monopolistic structure of Transnet, as the sole owner and operator of railways, ports and pipelines is unusual or a deviation from international practice. The answer is that the only example elsewhere in the world of a common agency owning and operating both the national railway and all of the nation's ports appears to be Turkey, where common control is now being eliminated as a part of harmonization of Turkish policies with those of the E.U. There are no examples of a unitary railway and ports agency that also owns all of the significant pipelines.

It is not uncommon to have a unitary and state-owned railway. However, as the E.U. example shows, this is changing almost everywhere. Russia, for example, has restructured its railway in a way that is spinning off the passenger services to a separated entity and is encouraging private investment in wagons and locomotives. Even Indian Railways has private investment in its railway container subsidiary, and the experience has been so successful that new and competing container and other special purpose railway companies are being created. In the 1990s, the unitary Latin American railways were broken into appropriate (integrated) pieces and concessioned for private operation (competition for the markets), as were a number of African railways. In fact, as mentioned earlier, the same Spoornet that believes in unitary and state-owned control (within a state-owned holding company) was an investor in a number of the African and Latin American rail concessions. Increasingly, solely at the railway level, the unitary railway monolith is being broken up into market-driven pieces, each suited to the geographic or commodity markets it serves.

²³ It is worthwhile noting that independent contracting of rolling stock maintenance has become common and accepted whereas private contracted maintenance of track can be more difficult. In the U.K., for example, the sale of the old BR track maintenance capability, and forcing Railtrack to rely totally on these contractors, was one of the least successful parts of the privatization. In fact, Network Rail (Railtrack's successor) has now brought most track maintenance back in house.

The typical model for ports everywhere is a separation between “infrastructure” and the various operations. The underlying land and infrastructure is usually owned by public agencies (though often at the local rather than national level) and the operations are leased or concessioned to public or private operators (again, competition **for** the market). At least partly because the interests of the local owners are important, it is not typical for large, multi-port countries to allow all of the ports to be controlled by a central, national agency. In fact, ports often compete for traffic, a process that arguably leads to waste of resources to build ports, but that also benefits shippers by offering choices of service and costs and without supporting inefficient ports at the cost of more efficient ports. Ports are also usually separated from the connecting modes in order, for example, to ensure that a mode owned by the port (for example, a railway or barge line) does not receive preferential access to the port at the expense of the other modes, for which the owner might benefit, but the country would lose; however, there are arguments (Bell and Bichou, 2007) in favor of allowing at least some of the port operators to acquire or joint venture with land-side modes in order to provide seamless transport, especially when the total logistical cost is important and the seamless service capability is critical.

The NFLS mentions another significant problem when modes are owned in common. When monopoly profits are generated (as by definition they are in the Transnet case), where do the “rents” go? Are they really being employed for the benefit of the country? When information about performance, and “rents” at any level below the most general is being withheld within the Transnet conglomerate boundaries, what, other than “trust us” is the assurance that the “rents” have even been accurately identified, much less productively deployed?

The normative model for Transnet is simple. Break it up into its constituent parts.

Transnet currently operates without effective external regulation (though some partial regulation of port and pipeline tariffs is in the works). As the NFLS emphasizes, Transnet’s monopoly franchise is so broad and opaque that it is free to generate monopoly “rents” and then distribute them without effective supervision or challenge. Although Transnet’s unitary structure is rooted in the autarchic years of apartheid and isolation when centralized control was unavoidable, no other country in the world has a similar structure because of the harmful effects on efficiency, competitiveness and transparency in the management of public resources. A lack of detailed information makes it difficult to quantify the cost of Transnet’s structural inefficiency to the South African economy. Spoornet’s high freight tariffs in the GFB business, and the high tariffs and low productivity of the port activities, along with the history of under-maintenance in all areas, are at least indications of a significant underlying problem.

This does not imply that Spoornet, NPA, SAPO and Petronet are not critical to South Africa’s economy. Instead it means that the conglomerate whole is less than the sum of its parts, and that proper development of each would be fostered by a different structure along the lines typical of other competitive and market oriented economies.

A reformed Spoornet along the lines discussed above could easily survive as a separate company within a reasonable policy environment, especially with an adequate definition and compensation for social functions. Spoornet is, after all, roughly the tenth largest railway system

in the world and, unlike many systems, has highly competent technical management and has already been unburdened of the passenger responsibility. It has clearly proven that, under the right circumstances, it is fully capable of world class performance. It is simply not at all evident why Spoornet is in any way different from smaller and less capable railways or why it needs any parent to look after it.

Spoornet would thus become an independent SOE reporting directly to DPE. Over time, Spoornet would be restructured as discussed above, depending on the resolution of policy issues relating to competition and private sector participation. Spoornet might well need continuing public funding, as is the case with many of the world's railways, depending on the social role assigned to it, but this is an issue that should be transparently defined and decided. Profits from the OreEx and CoalEx lines will not support the entire GFB system sustainably.

On the ports side, NPA and SAPO could be broken apart and, further, infrastructure ownership and control could be separated from control of operations. Competition **for** the market could be encouraged on the operations and service side. At least some of the port functions could be devolved safely to local agencies, public or private. If this happened, South Africa (as opposed to Transnet) would know – in ways that it does not know today – which ports are efficient and which are not. The crucial linkage from Durban to Gauteng would not potentially be hostage to an opaque set of internal priorities elsewhere, and Spoornet might be able to find the money and the incentive to provide better service. Conversely, investment in Ngqura would properly be made to serve national objectives rather than being linked to other ports (or Spoornet) priorities in a way that is not at all obvious – another example of the question of unclear SOE objectives. As suggested in the ports paper (Bell and Bichou, 2007), there may also be opportunities for some of the port operators to engage in land side transport in competition either with Spoornet or trucking companies.

NPA would therefore be decentralized, devolving significant authority to local agencies, and with at least some competition among ports introduced. NPA's successor agencies would function as landlord managers of port infrastructure with operations handled by separate agencies or companies. Given the national interest in effective port access, there might well remain a national role in financing at least a part of the infrastructure in various ports. **SAPO** would be separated into operating agencies for each port and eventually, depending on local choices, either operated as municipal agencies or transferred to private operators. Both NPA and SAPO are currently profitable, and there is little reason to think that they would need significant public funding, even when separated.

The benefits of inclusion of Petronet within the Transnet umbrella are also unclear. It is clear that Petronet, like the rest of the Transnet conglomerate, has suffered from under-maintenance and investment. It is also arguable that Transnet has the resources to repair the damage and increase capacity. But, it is not clear where this money will come from and at what expense to other priorities. Generally speaking, pipeline technology is sufficiently different, and the economics sufficiently secure, that pipeline companies need regulators to **limit** their earnings, not parents to **protect** them.

Petronet would be separated and report to DPE at the outset, but might well be a candidate for private operation at some point in the future. Petronet is also sufficiently profitable that it should be capable of fully independent financing, as is the case elsewhere.

In all cases, the new agencies would each report their performance separately, and in accord with international financial reporting standards (IFRS). This would form the essential basis for public evaluation and regulation.

The question of objectives applies *a fortiori* to Transnet, in addition to Spoornet. Given that no other market economy follows this model, what, exactly, does Transnet bring to the table that would not be equally available without it, and without the extra level of overhead that it brings? What are the costs as well?

It is likely that the basic concept of Transnet is rooted in the apartheid siege mentality of the 1970s and 1980s when autarky and central control were a natural response to the perceived threat from outside. Most countries under siege react similarly, attempting to coordinate or centralize all significant activities (particularly transport), and limiting the information available to a potential adversary. Clearly this is where SATS came from, and it seems possible that the ensuing approach simply has never been challenged. Now might be a good time to do so.

What might be the benefits of a conglomerate like Transnet that offset its manifest risks and disadvantages? It could, for example, be argued that Transnet has a uniquely qualified management team that could not be duplicated? It is true that the new management team has made progress, and there are highly qualified people in Transnet management. They should be given credit for the progress so far. This said, the skills in management of railways versus ports versus pipelines are so different that the synergies are highly questionable. Certainly in the developed market economies, there are few companies that would try to manage such different activities, especially when subjected to effective competition from more focused companies. Again, the models elsewhere give a useful clue and add force to the question: “is there something so unique about the South African policy or management environment that it demands a model that would not be replicated elsewhere?”

One argument for retaining Transnet as the unitary manager of railways, ports and pipelines has been a desire to “coordinate” all of South Africa’s transport facilities into a single logistics chain that can compete effectively with those of other countries. This argument ignores the fact that **countries** don’t have logistics chains – producers, shippers, receivers and transportation companies work together to form them. Public “coordination” is antithetical to the kind of rapid, commercial, and market sensitive decision making that logistics chains require. The current system of international trade is so large and competitive that an incompatible approach by any single country will not promote, and could actually be harmful to its international competitive position.

A supporting contention has been that Transnet’s ability to finance itself without added money from the fiscus requires unitary management. This is equivalent to saying that, given a wide enough monopoly over a vital economic sector without effective regulation and with full ability to

transfer finances internally without public reporting, Transnet could extract enough in rents to relieve the need for direct public financing of social needs. While this may be true, self financing comes at a high price of internal and external inefficiency -- one which most other countries believe is too high.

To be fair, self-financing, albeit costly to the nation, may have the benefit of stability of approach. Most infrastructure facilities, specifically including railways, ports and pipelines, require steady financing over a long period of years: they often do not do as well in the ups and downs of changing budget priorities in an open and democratic society. Palpably Transnet, and SATS before it, did not succeed in providing adequate and stable financing for any of the functions in the past. In future, however, if management remains in place for a period of years, and if the foundations of the cross subsidies on which financing will be based are not eroded by increasing regulation of port and pipeline tariffs, it is possible that Spoornet, in particular, will receive more capital investment that it would if it were operated separately.

Economies of scale considerations are also used to buttress arguments for large entities. This would have little relevance to Transnet since its constituent parts are already large enough to capture whatever economies are available. Transnet management has made progress in reforming the company and planning a large investment program, but the challenge of actually **managing** such disparate organizations as railways, ports and pipelines has not been successfully undertaken elsewhere, partly because of the multiplicity of skills involved, and partly because of anti-competitive concerns.

Transnet argues that it has a "Mandate" to carry out its Strategic Plan and its related investment program and that Government has decided that it should remain unitary for the foreseeable future. Abrupt changes would disrupt this program and add costs if it is completed piecemeal by newly separated agencies. Moreover, Transnet has undertaken a large borrowing program based on its corporate debt capacity that would be complex to unwind if it were separated.

These arguments deserve serious consideration, especially in the timing of any change that is developed. Continuity of policy and purpose is important and restructuring should not be undertaken lightly. At the same time, the mandate is actually for only three years, and is reviewable by either party annually. A responsible modification in the mandate or, indeed, in Transnet's structure, is entirely feasible.

It is worth emphasizing that a significant change has been proposed in the "Mandate" without renegotiation or much public discussion. The 2005/2006 Shareholder's Compact contained a provision (4.3.4) that stated "The Parties further agree that Transnet shall, where appropriate, facilitate and introduce Private Sector Participation (PSP) in ports and rail." **The draft 2007/2008 Compact omits this provision.** It is not clear how this omission emerged and it is possibly a simple error. What is clear is that omitting the provision apparently will foreclose a potentially important element in reform in contradiction to the proposals of the NFLS and to worldwide practice. It is important to clarify the intention of the drafters of the 2007/2008 Compact.

This suggests a modified Transnet structure along the same principles as for Spoornet:

- As a first step, and without necessarily committing to full breakup of Transnet, each of the Transnet divisions should begin to report separately and publicly, in accord with IFRS. This would include separate Income Statements and Balance Sheets for Spoornet, NPA (separately for each port), SAPO (separately for each port authority), and Petronet. Transnet could continue to report on a consolidated basis as well.
- Separate restructuring plans would be developed for each of the businesses, though they might still remain under the overall tutelage of the Transnet holding pending completion of the investment program.
- The existing Transnet program of spin offs of non-core activities would continue, but Transwerk could be added.
- Government would decide on the degree of private involvement in railways, ports and pipelines and incorporate the decisions in the restructuring framework. It deserves emphasis that private involvement will only be possible if Transnet is disaggregated: it would never be feasible to privatize Transnet as a unitary corporation.
- At some point in the medium term (5 to 10 years), depending on the outcome of the above steps, the role of Transnet as a conglomerate parent could be reduced or even eliminated

Is the original search for autarky and protection against a hostile world still valid? Does South Africa somehow still face an external threat that requires such centralization? On a broad political level, of course it does not. South Africa has become a leader in the developing world and a capable member of the developed world markets: there is no external threat as there was in the past. On a more specific level, the more serious threat is much simpler: inefficient enterprises (whether public or private), and their countries, suffer. This is already well recognized in South Africa. The question then becomes more appropriately, “do centralization and conglomerization somehow promote efficiency?” If so, how and where?

What is the value of “coordination” as opposed to competition? This is a plausible question, the answer to which goes to the heart of what South Africa is trying to accomplish in its development strategy. **Planned** economies always place a high value on “coordination”: it is the heart of formulation and implementation of planning. **Market** economies are ultimately driven by competition, even though it makes the individual participants uncomfortable. Competition may well waste some resources because there are (arguably wasteful) losers as well as winners, but the net result is greater efficiency and ultimately greater welfare if the country’s social policies are adequate and if the country does not unduly mix the role of government and enterprise (even when enterprises are publicly owned). What kind of economic structure does South Africa really want?

Do cross subsidies really work, and at what price? As the NFLS recognizes, Transnet’s multiple monopoly positions do indeed offer many opportunities for cross subsidies and, as the NFLS again recognizes, it is clear that significant rents have been earned and cross subsidies have been spent **somewhere**. Unfortunately, as the NFLS also recognizes, such rents have not in the past generated adequate maintenance of the assets of the conglomerate or, indeed, of any of its constituent parts. Spoornet, NPA, SAPO and Petronet are all capable of world class performance in individual circumstances, and all could or should be profitable, but none is well

maintained today. The hope is that future earnings and balance sheet depth will be sufficient to pay for catch-up from past neglect; but, as discussed earlier, no change in structure or ownership has really changed management's incentives to do a better job in future than has been done in the past. Where have been the real benefits of cross subsidies in the past, and why would the future generate and efficiently deploy benefits that appear to have been wasted in the past?

South Africa is indeed unique and independent, and there may well be answers to these questions that are fully satisfactory in the national policy context. As the NFLS makes clear, the answers almost certainly do not lie within the **transport** sectoral context, nor do they lie within the narrower context of **railways** or **ports** or **pipelines**. If the NFLS is correct, then South Africa would benefit from a thorough debate on these questions and on the implications of the answers that emerge.

Ultimately, the proposed decisions on Spoornet and Transnet involve weighing costs and benefits – economic efficiency versus various measures of equity, the balance between public and private sectors, the importance and value of social and political objectives – that clearly go beyond technical analysis. This paper supports the NFLS in concluding that the vital transport sector in South Africa could be made more efficient and market-sensitive by restructuring. It is now for the policy makers to decide what best serves South Africa's interests.

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Table 1: International Railway Comparisons

Size and Scale Indicators											Performance Indicators					
	Year	Total	Route km	Total	Freight	Passengers	Passenger-	Freight	Freight	Staff	Diesel	Average	Freight	Output	Staff	Traffic
		Route km	Electrified	Locs	Wagons	(000)	kilometers	Tonnes	Tonne-km		Locomotive	Lead,	tonne-km	per staff	per km	Density
							(000,000)	(000,000)	(000,000)		Availability	Freight	per Wagon	(000 TU)	of Line	(000 of TU per km)
											(%)	(km)	(000)	(000 TU)		
LATIN AMERICA:																
Argentina (all)	2005	18,504	209	461	23,500	253,318	7,845	23.4	12,262	5,300				3,794	0.29	1,087
Bolivia (all)	2004	2,743		54	1,907	705	264	1.3	969	785	60	524	508	1,571	0.29	450
Brazil (all)	2005	27,666	1,220	2,394	90,119	215,136	3,336	387.6	221,300	24,469		571	2,456	9,180	0.88	8,120
Chile (Fepasa Only)	2004	2,379						8.6	1,795	590	48	210		3,042	0.25	755
Mexico (all)	2005	17,382	250	1,088	32,560			97.2	70,899	14,000	68	729	2,177	5,064	0.81	4,079
Peru (all)	2002	1,580				950	80	2.2	750	1,200		341		692	0.76	525
Uruguay	2005	3,003		22	1,788	517	12	1.3	331	511		251	185	672	0.17	114
AFRICA (SUB SAHARAN):																
Cameroun	2005	1,016		67	1,130	1,021	325	1.8	1,052	2,200		579	931	626	2.17	1,355
Congo--CFCO	2005	795		29	1,070	500	135	0.6	231	600		385	216	610	0.75	460
Cote D'Ivoire (all of Sitarail)	2004	1,261		20	807	100	10	0.6	501	3,126	53	880	621	163	2.48	405
Gabon	2004	810		20	548	200	95	3.9	2,219	1,300		569	4,049	1,780	1.60	2,857
Ghana	2004	977		61	750	2,340	85	1.9	242	3,777		129	323	87	3.87	335
Kenya	2002	2,634		152	5,154	4,794	288	2.2	1,538	7,000		691	298	261	2.66	693
Malawi	2004	710		24	478	395	26	0.2	38	487		158	79	131	0.69	90
Namibia	1995	2,382		50	1,627	124	49	1.8	1,082	1,944	89	615	665	581	0.82	474
Nigeria	2005	3,557		126	2,744	1,526	363	0.1	105	13,618	19	827	38	34	3.83	132
Senegal/Mali (Transrail)	2005	1,546			602	500	275	1.5	541	1,500		350	899	544	0.97	528
Spoornet	2005	20,247	10,450	2,646	94,210	3,100	991	182.2	109,721	32,516		602	1,165	3,405	1.61	5,468
Sudan	2005	5,478		115	4,651	100	40	1.3	766	11,800		589	165	68	2.15	147
Tanzania	2006	2,722		86	1,828	694	433	1.7	1,970	9,000		1,152	1,078	267	3.31	883
TAZARA	2000	1,860		75	2,235	1,641	518	0.6	780	4,175		1,231	349	311	2.24	698
Uganda	2004	259		43	1,431			0.9	218	1,150		241	152	190	4.44	842
Zaire	2005	3,641	858	136	3,876	400	140	1.2	444	13,600		370	115	43	3.74	160
Zambia	1999	1,273		62	5,758	830	186	1.6	554	3,400		339	96	218	2.67	581
Zimbabwe	1997	2,759	311	169	11,385	1,598	583	12.0	4,871	12,025	70	406	428	454	4.36	1,977
MIDDLE EAST&N. AFR:																
Algeria	2005	3,572	283	221	10,026	27,300	929	8.3	1,471	10,500		177	147	229	2.94	672
Egypt	2005	5,150	65	671	11,592	451,100	40,837	10.1	3,917	91,400		388	338	490	17.75	8,690
Iran	2005	7,131	148	606	19,848	19,400	11,149	30.3	19,127	13,700		631	964	2,210	1.92	4,246
Jordan	2005	293		19	346			2.9	1,024	600		353	2,960	1,707	2.05	3,495
Morocco	2005	1,907	1,014	199	5,707	18,500	2,987	32.9	5,919	9,300		180	1,037	958	4.88	4,670
Saudi Arabia	2005	1,020		56	2,060	1,100	393	2.6	1,192	1,600		458	579	991	1.57	1,554
Syria	2002	2,450		183	5,313	1,417	364	5.9	1,812	11,500		306	341	189	4.69	888
Tunisia	2005	1,909	65	174	3,903	36,804	1,319	10.8	2,067	5,226		192	530	648	2.74	1,774
EUROPE & C. ASIA:																
Albania	2005	447		58	824	1,400	73	0.4	26	2,200		65	32	45	4.92	221
Bulgaria	2005	4,154	2,880	584	12,414	33,700	2,389	20.3	5,164	33,700		254	416	224	8.11	1,818
Czech Republic	2005	9,513	2,997	2,167	34,610	178,200	6,631	75.8	14,385	65,200		190	416	322	6.85	2,209
Slovakia	2005	3,659	1,556	212	16,370	49,100	2,166	47.7	9,326	36,600		196	570	314	10.00	3,141
Hungary	2005	7,730	2,628	981	16,658	120,400	6,953	44.0	8,537	44,600		194	512	347	5.77	2,004
Poland	2005	19,507	11,851	3,689	75,164	218,000	16,742	155.1	45,438	127,700		293	605	487	6.55	3,188
Romania	2005	10,844	3,929	1,864	55,231	91,500	7,960	67.5	16,032	67,100		238	290	358	6.19	2,212
Turkey	2005	8,697	1,920	531	16,102	76,306	5,036	18.9	9,078	30,991	82	479	564	455	3.56	1,623
Macedonia	2005	699	233	56	1,525	900	94	3.1	530	2,900		171	348	215	4.15	893
Yugoslavia	2005	3,809	1,247	365	10,561	13,500	852	12.6	3,482	22,300	27	276	330	194	5.85	1,138
Croatia	2005	2,726	948	278	7,330	39,800	1,266	14.3	2,835	14,200		198	387	289	5.21	1,504
Slovenia	2005	1,228	503	149	3,946	15,700	777	16.3	3,245	8,100		199	822	497	6.60	3,275

Table 1: International Railway Comparisons (continued)

Size and Scale Indicators											Performance Indicators					
	Year	Total	Route km	Total	Freight	Passengers	Passenger-	Freight	Freight	Staff	Diesel Locomotive Availability (%)	Average Lead, Freight (km)	Freight tonne-km per Wagon (000)	Output per staff (000 TU)	Staff per km of Line	Traffic Density (000 of TU per km)
		Route km	Electrified	Locs	Wagons	(000)	kilometers (000,000)	Tonnes (000,000)	Tonne-km (000,000)							
EUROPE & C. ASIA:																
Russia	2005	85,245	43,000	12,213	540,529	1,338,723	172,217	1,281.3	1,858,100	1,161,900		1,450	3,438	1,747	13.63	23,817
Ukraine	2005	22,001	9,407	4,370	150,254	518,400	52,655	462.4	223,980	368,200		484	1,491	751	16.74	12,574
Kazakhstan	2005	14,204	4,136	1,702	88,541	15,900	12,129	215.5	171,855	94,300		797	1,941	1,951	6.64	12,953
Belarus	2005	5,498	898	606	25,281	141,000	13,568	125.1	43,559	78,300		348	1,723	730	14.24	10,391
Estonia	2005	959	131	113	3,279	5,200	248	44.8	10,311	3,300		230	3,145	3,200	3.44	11,010
Georgia	2005	1,515	1,246	322	11,732	3,600	720	19.0	6,127	15,800	46	322	522	433	10.43	4,519
Latvia	2005	2,375	462	205	5,290	25,900	894	54.9	17,921	14,600		326	3,388	1,289	6.15	7,922
Lithuania	2005	1,772	122	240	9,309	6,700	428	49.3	12,457	11,300		253	1,338	1,140	6.38	7,271
Armenia	2005	711	711	56	3,846	703	27	2.6	654	4,745		250	170	143	6.67	957
Uzbekistan	2005	4,014	594	286	10,406	16,100	2,012	53.8	18,007	35,400		335	1,730	566	8.82	4,987
EAST ASIA:																
China	2005	62,200	19,400	16,453	541,824	1,106,510	583,320	2,309.2	1,934,612	1,665,588		838	3,571	1,512	26.78	40,481
Republic of Korea	2005	3,392	1,668	587	9,121	921,300	31,004	44.5	10,108	29,300		227	1,108	1,403	8.64	12,120
Malaysia	2005	1,667	150	100	3,707	3,700	1,181	4.0	1,178	5,000		295	318	472	3.00	1,415
Mongolia	2005	1,810	111	111	2,633	4,300	1,228	14.1	8,857	15,200		628	3,364	663	8.40	5,572
Thailand	2004	4,044	278	278	6,900	50,873	9,332	13.8	4,085	19,000		296	592	706	4.70	3,318
Viet Nam	2005	2,671		321	4,975	12,800	4,558	8.7	2,928	44,200		337	589	169	16.55	2,803
SOUTH ASIA:																
Bangladesh	2005	2,855		286	10,236	42,254	4,164	3.2	817	35,172	76	255	80	142	12.32	1,745
India	2005	63,465	17,495	7,910	222,379	5,378,000	575,702	602.1	407,398	1,422,200		677	1,832	691	22.41	15,490
Pakistan	2005	7,791	305	592	21,812	78,200	24,237	6.4	5,013	86,807		782	230	337	11.14	3,754
Sri Lanka	2005	1,200		141	2,458	114,400	4,358	1.5	135	16,360		90	55	275	13.63	3,744
OTHER COUNTRIES:																
Austria	2005	5,690	3,553	1,229	15,846	191,600	8,470	81.7	17,036	47,200		209	1,075	540	8.30	4,483
Belgium	2005	3,542	2,975	759	12,756	186,600	9,150	61.0	8,130	37,200		133	637	465	10.50	4,879
Denmark	2005	2,212	620	63	152,400	5,459	152,400	5,459	3,170					1,722	1.43	2,468
Finland	2005	5,732	2,617	545	11,162	63,500	3,478	40.7	9,706	10,300		238	870	1,280	1.80	2,300
France	2005	29,286	14,765	4,588	35,456	962,700	76,159	129.7	41,898	167,200		323	1,182	706	5.71	4,031
Greece	2005	2,576	83	164	3,204	10,000	1,854	3.0	613	8,100		204	191	305	3.14	958
Ireland	2005	1,919	52	94	926	37,700	1,781	1.5	303	5,500		202	327	379	2.87	1,086
Israel	2005	899		74	640	26,800	1,618	7.5	1,149	1,600		153	1,795	1,729	1.78	3,078
Italy	2005	16,225	11,364	3,297	44,242	516,800	46,144	68.7	20,131	99,100		293	455	669	6.11	4,085
Japan	2005	20,052	12,217	1,200	9,000	8,683,900	245,957	37.1	22,632	135,600		610	2,515	1,981	6.76	13,395
Netherlands	2005	2,813	2,066	121	321,100	14,730	321,100	14,730	27,300					540	9.70	5,236
Portugal	2005	2,839	1,436	154	3,255	130,600	3,412	9.6	2,422	8,600		252	744	678	3.03	2,055
Spain	2005	14,484	8,157	894	17,238	610,700	21,047	29.7	11,586	19,100		390	672	1,709	1.32	2,253
Sweden	2005	9,867	7,636	533	7,290	34,900	5,673		13,120	13,200			1,800	1,424	1.34	1,905
Switzerland	2005	3,011	3,011	1,655	10,769	275,900	13,830	56.2	8,571	25,900		153	796	865	8.60	7,440
United Kingdom	2005	15,810	5,205	410		1,082,000	43,200	103.9	22,110			213			0.00	4,131
Germany	2005	34,218	19,350	4,787	156,751	1,785,400	72,554	274.6	88,022	224,600		321	562	715	6.56	4,693
New Zealand	2000	3,904						14.7	4,078	4,064		277		1,003	1.04	1,045
Canada: Via Rail	2005	13,490		76		4,097	1,430			3,059				467	0.23	106
Canada: Canadian National	2005	31,894		2,073	96,153			212.6	262,589	22,246		1,235	2,731	11,804	0.70	8,233
Canada: Canadian Pacific	2005	21,962		1,669	55,480			120.4	183,100	16,448		1,520	3,300	11,132	0.75	8,337
USA: Amtrak	2005	36,000		382		24,164	8,681			19,177				453	0.53	241
USA: All Class I Railways	2005	153,787		23,198	1,290,000			1,723.0	2,478,914	162,438		1,439	1,922	15,261	1.06	16,119
Africa Total		53,927	11,619	3,881	140,284	19,863	4,542	216.3	126,873	123,218						
Spoornet Percent		37.55	89.94	68.18	67.16	15.61	21.82	84.26	86.48	26.39						
World Total		922,720	240,397	115,820	4,044,368	26,770,040	2,203,604	9,610	8,523,997	6,957,264						
Spoornet Percent		2.19	4.35	2.28	2.33	0.01	0.04	1.90	1.29	0.47						
Indicates Private Management																

Table 2: Spoornet Rankings

	Spoornet Ranking**	Spoornet Percent of World Total
Size or Scale		
Line kilometers	11	2.19
Electrified Line kilometers	9	4.35
Locomotives	10	2.28
Freight Wagons	8	2.33
Tons	10	1.90
Ton-kilometers	9	1.29
Performance Measure		
Average Freight Haul (kilometers)	19	na
Ton-kilometers/Wagon	22	na
Traffic*/Staff	6	na
Traffic*/kilometer of Line	18	na
* Traffic is Tonne-Km + Passenger-kilometers		
** The two Canadian Railways are considered one system		

Table 3: Spoornet Freight Traffic by Commodity in Tonnes (000,000)

	1991*	1995*	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	49.1	59.5	61.6	63.2	64.7	63.6	66.8	64.8	64.4	65.8	66.9	68.8
IRON ORE EXPORT LINE	15.0	22.2	20.1	22.2	22.1	21.4	23.8	25.8	25.0	27.0	28.2	29.6
MANGANESE	3.1	4.0	4.5	5.2	5.0	4.8	5.0	4.7	5.0	5.3	5.8	5.2
GRANITE AND ASBESTOS	0.6	0.7	0.8	0.9	0.8	0.9	1.0	0.9	0.8	0.6	0.5	0.5
COAL	4.4	6.5	7.2	9.3	9.5	9.2	8.9	9.1	9.6	10.6	8.9	9.1
CHROME	3.3	5.3	4.8	5.3	4.9	5.3	5.7	4.9	4.5	4.6	4.4	4.1
NON-FERROUS METALS	1.3	1.5	2.7	4.0	4.3	4.5	4.2	3.9	1.7	2.1	2.3	1.9
MINERAL MINING	4.3	4.7	3.1	3.3	3.4	3.5	3.3	3.3	3.1	2.9	3.3	3.9
FUEL AND PETROLEUM	5.6	5.4	5.4	4.9	4.5	4.4	4.2	3.6	3.4	3.5	3.2	3.0
CHEMICALS	4.7	4.4	3.9	4.0	3.9	4.1	3.5	3.0	2.3	2.5	2.2	2.3
FERTILIZER	2.0	2.5	4.6	4.2	4.5	4.6	3.5	3.4	3.4	3.1	3.3	3.2
CEMENT & LIME	7.7	8.5	8.3	8.3	7.7	8.1	8.6	8.6	9.1	9.5	10.4	10.3
IRON & STEEL AND SCRAP	27.1	25.4	24.7	24.2	21.3	20.0	21.0	21.7	21.7	22.7	22.6	21.6
FMCG	3.3	2.1	2.6	2.9	2.8	3.2	3.3	2.6	2.6	2.5	2.3	2.3
AUTOMOTIVE AND INDUSTRIAL	0.2	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.2	0.2	0.3
GRAIN & STOCKFEED AND MILLING	7.1	6.5	6.5	6.6	6.3	6.6	6.6	6.3	6.0	5.8	5.2	5.7
TIMBER & PAPER AND PUBLISHING	5.3	5.2	5.1	5.8	5.3	5.6	6.4	6.1	6.3	6.2	5.8	5.4
INTERMODAL WHOLESALE	0.5	0.7	3.5	3.5	3.4	3.3	3.3	3.5	3.4	3.2	3.1	2.8
Consolidation, AFR trade & Other	19.3	10.5	11.0	9.0	7.9	5.6	6.0	4.7	3.9	2.7	2.6	2.3
TOTAL GFB	99.7	94.0	98.7	101.5	95.8	93.8	94.5	90.2	87.1	87.9	86.1	83.8
GRAND TOTAL	163.8	175.6	180.4	186.8	182.7	178.8	185.2	180.9	176.5	180.6	181.2	182.2

Source: Spoornet

* Note: 1991 and 1995 are taken from a different Spoornet sources than 1996-2005. Numbers differ very slightly.

Because detailed data for the Consolidation category differed, the single entry "Consolidation, AFR trade and Other contains all commodities not otherwise specifically delineated.

Table 4: Percentage of Tonnes

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	30.0	33.9	34.1	33.8	35.4	35.5	36.1	35.8	36.5	36.4	36.9	37.7
IRON ORE EXPORT LINE	9.2	12.6	11.2	11.9	12.1	12.0	12.9	14.3	14.2	15.0	15.6	16.3
MANGANESE	1.9	2.3	2.5	2.8	2.7	2.7	2.7	2.6	2.8	2.9	3.2	2.8
GRANITE AND ASBESTOS	0.3	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.3	0.3	0.3
COAL	2.7	3.7	4.0	5.0	5.2	5.1	4.8	5.0	5.5	5.8	4.9	5.0
CHROME	2.0	3.0	2.7	2.9	2.7	2.9	3.1	2.7	2.6	2.5	2.4	2.2
NON-FERROUS METALS	0.8	0.9	1.5	2.1	2.4	2.5	2.3	2.2	1.0	1.2	1.3	1.0
MINERAL MINING	2.6	2.7	1.7	1.7	1.8	1.9	1.8	1.8	1.8	1.6	1.8	2.1
FUEL AND PETROLEUM	3.4	3.1	3.0	2.6	2.5	2.5	2.3	2.0	1.9	2.0	1.8	1.7
CHEMICALS	2.9	2.5	2.1	2.2	2.2	2.3	1.9	1.7	1.3	1.4	1.2	1.2
FERTILIZER	1.2	1.4	2.5	2.3	2.5	2.6	1.9	1.9	1.9	1.7	1.8	1.7
CEMENT & LIME	4.7	4.8	4.6	4.4	4.2	4.5	4.7	4.7	5.2	5.2	5.7	5.6
IRON & STEEL AND SCRAP	16.6	14.5	13.7	13.0	11.7	11.2	11.3	12.0	12.3	12.5	12.4	11.9
FMCG	2.0	1.2	1.4	1.5	1.6	1.8	1.8	1.4	1.5	1.4	1.3	1.3
AUTOMOTIVE AND INDUSTRIAL	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2
GRAIN & STOCKFEED AND MILLING	4.4	3.7	3.6	3.5	3.5	3.7	3.6	3.5	3.4	3.2	2.9	3.1
TIMBER & PAPER AND PUBLISHING	3.2	3.0	2.8	3.1	2.9	3.1	3.5	3.4	3.6	3.4	3.2	3.0
INTERMODAL WHOLESALE	0.3	0.4	1.9	1.9	1.9	1.9	1.8	2.0	1.9	1.8	1.7	1.5
Consolidation, AFR trade & Other	11.8	6.0	6.1	4.8	4.3	3.1	3.2	2.6	2.2	1.5	1.4	1.3
TOTAL GFB	60.9	53.5	54.7	54.3	52.4	52.5	51.1	49.9	49.3	48.6	47.5	46.0
GRAND TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 5: Spoornet Freight Traffic by Commodity in Tonne-Kilometers (000,000)

COAL EXPORT LINE	26,760	32,405	34,017	35,338	36,548	35,913	37,584	36,667	36,594	37,556	38,420	39,504
IRON ORE EXPORT LINE	13,002	19,553	17,725	19,574	19,500	18,857	20,968	22,721	22,063	23,816	24,897	26,110
MANGANESE	2,323	3,202	3,568	4354.9	4,102	3,957	4,126	3,926	4,207	4,637	5,339	4,728
GRANITE AND ASBESTOS	313	650	780	805.9	711	815	876	711	631	437	402	399
COAL	1,678	3,485	3,165	3813.9	4,198	4,188	4,548	4,273	4,371	4,354	3,623	4,028
CHROME	1,724	2,915	2,774	3232.1	3,021	3,132	3,435	2,837	2,504	2,548	2,523	2,543
NON-FERROUS METALS	356	301	358	422.3	464	378	480	495	417	376	458	416
MINERAL MINING	2,131	2,321	702	834.3	955	1,049	1,084	1,087	1,031	997	1,156	1,287
FUEL AND PETROLEUM	1,907	2,187	2,381	2090.8	1,861	1,794	1,646	1,627	1,361	1,464	1,477	1,432
CHEMICALS	2,052	1,892	1,589	1722.1	1,649	1,713	1,930	1,639	1,350	1,403	1,214	1,159
FERTILIZER	1,075	1,476	3,243	3038.7	3,352	3,447	2,721	2,706	2,835	2,569	2,708	2,700
CEMENT & LIME	2,914	3,412	3,300	3417.0	3,273	3,341	3,622	3,534	3,611	3,827	4,260	4,065
IRON & STEEL AND SCRAP	13,269	12,063	12,189	11984.2	11,237	10,854	11,696	12,026	12,311	13,125	13,107	12,364
FMCG	1,166	817	978	1033.4	1,057	1,286	1,204	1,147	1,026	1,034	930	900
AUTOMOTIVE AND INDUSTRIAL	59	40	54	97.7	154	133	29	16	120	186	218	256
GRAIN & STOCKFEED AND MILLING	3,002	2,489	2,919	2816.8	2,745	2,548	3,325	3,224	3,039	2,846	2,633	3,125
TIMBER & PAPER AND PUBLISHING	2,159	1,965	2,034	2272.5	2,097	2,243	2,539	2,347	2,335	2,062	1,876	1,779
INTERMODAL WHOLESALE	254	424	2,825	2846.6	2,623	2,602	2,668	2,813	2,686	2,343	2,530	2,262
Consolidation, AFR trade & Other	9,427	4,961	5,083	4091.9	3,172	2,139	2,125	1,595	1,226	958	733	743
TOTAL GFB	45,807	44,601	47,944	48,875	46,671	45,620	48,053	46,003	45,061	45,166	45,186	44,185
GRAND TOTAL	85,569	96,559	99,688	103,787	102,719	100,389	106,605	105,393	103,718	106,538	108,503	109,721

Source: Spoornet

* Note: 1991 and 1995 are taken from a different Spoornet sources than 1996-2005. Numbers differ very slightly.

Because detailed data for the Consolidation category differed, the single entry "Consolidation, AFR trade and Other contains all commodities not otherwise specifically delineated.

Table 6: Percent of Tonne-km

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	31.3	33.6	34.1	34.0	35.6	35.8	35.3	34.8	35.3	35.3	35.4	36.0
IRON ORE EXPORT LINE	15.2	20.3	17.8	18.9	19.0	18.8	19.7	21.6	21.3	22.4	22.9	23.8
MANGANESE	2.7	3.3	3.6	4.2	4.0	3.9	3.9	3.7	4.1	4.4	4.9	4.3
GRANITE AND ASBESTOS	0.4	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.6	0.4	0.4	0.4
COAL	2.0	3.6	3.2	3.7	4.1	4.2	4.3	4.1	4.2	4.1	3.3	3.7
CHROME	2.0	3.0	2.8	3.1	2.9	3.1	3.2	2.7	2.4	2.4	2.3	2.3
NON-FERROUS METALS	0.4	0.3	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4
MINERAL MINING	2.5	2.4	0.7	0.8	0.9	1.0	1.0	1.0	1.0	0.9	1.1	1.2
FUEL AND PETROLEUM	2.2	2.3	2.4	2.0	1.8	1.8	1.5	1.5	1.3	1.4	1.4	1.3
CHEMICALS	2.4	2.0	1.6	1.7	1.6	1.7	1.8	1.6	1.3	1.3	1.1	1.1
FERTILIZER	1.3	1.5	3.3	2.9	3.3	3.4	2.6	2.6	2.7	2.4	2.5	2.5
CEMENT & LIME	3.4	3.5	3.3	3.3	3.2	3.3	3.4	3.4	3.5	3.6	3.9	3.7
IRON & STEEL AND SCRAP	15.5	12.5	12.2	11.5	10.9	10.8	11.0	11.4	11.9	12.3	12.1	11.3
FMCG	1.4	0.8	1.0	1.0	1.0	1.3	1.1	1.1	1.0	1.0	0.9	0.8
AUTOMOTIVE AND INDUSTRIAL	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.2	0.2	0.2
GRAIN & STOCKFEED AND MILLING	3.5	2.6	2.9	2.7	2.7	2.5	3.1	3.1	2.9	2.7	2.4	2.8
TIMBER & PAPER AND PUBLISHING	2.5	2.0	2.0	2.2	2.0	2.2	2.4	2.2	2.3	1.9	1.7	1.6
INTERMODAL WHOLESALE	0.3	0.4	2.8	2.7	2.6	2.6	2.5	2.7	2.6	2.2	2.3	2.1
Consolidation, AFR trade & Other	11.0	5.1	5.1	3.9	3.1	2.1	2.0	1.5	1.2	0.9	0.7	0.7
TOTAL GFB	53.5	46.2	48.1	47.1	45.4	45.4	45.1	43.6	43.4	42.4	41.6	40.3
GRAND TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 7: Spoornet Revenue by Commodity (000,000 Current RAND)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	1,333.2	1,723.7	1,893.5	2,033.0	2,174.3	2,196.6	2,385.0	2,476.7	2,609.9	2,936.2	3,057.3	3,218.5
IRON ORE EXPORT LINE	97.9	307.3	322.3	397.6	478.3	435.1	621.4	880.8	866.1	720.5	829.8	974.2
MANGANESE	199.0	270.5	318.2	392.5	392.1	394.7	436.7	455.6	564.9	676.9	802.4	781.3
GRANITE AND ASBESTOS	45.7	69.8	91.2	96.9	89.6	104.5	127.0	120.8	118.3	88.7	85.2	84.5
COAL	135.4	328.4	334.8	410.7	455.3	461.8	510.3	536.4	621.1	767.4	703.5	779.1
CHROME	173.3	342.1	351.2	430.5	422.0	457.1	508.8	435.5	423.6	465.5	491.9	507.5
NON-FERROUS METALS	38.7	38.1	50.4	61.3	85.9	95.3	110.7	135.9	108.3	107.3	95.7	88.7
MINERAL MINING	120.2	166.0	104.9	129.4	152.4	169.8	179.1	190.1	189.9	213.2	276.7	328.2
FUEL AND PETROLEUM	318.5	351.6	385.9	364.1	374.9	423.5	430.6	412.3	403.4	449.6	529.2	548.4
CHEMICALS	243.0	293.0	257.4	290.1	289.7	313.8	366.6	326.3	313.6	371.4	354.3	355.5
FERTILIZER	112.2	173.1	313.4	298.3	365.9	390.4	309.2	354.4	412.2	370.9	416.4	404.3
CEMENT & LIME	300.5	435.3	434.1	451.5	437.2	439.4	483.1	508.6	569.7	676.2	838.7	881.1
IRON & STEEL AND SCRAP	994.2	1,179.3	1,245.2	1,287.9	1,239.6	1,217.3	1,347.4	1,500.9	1,726.0	2,051.1	2,276.4	2,262.7
FMCG	196.9	145.1	153.8	174.0	178.2	210.3	243.2	204.0	205.1	218.6	217.6	228.7
AUTOMOTIVE AND INDUSTRIAL	19.2	17.5	22.3	42.3	67.2	73.2	101.3	94.5	97.1	130.3	146.4	190.3
GRAIN & STOCKFEED AND MILLING	333.7	365.4	439.3	432.1	404.4	405.2	506.3	520.7	577.7	612.1	636.6	752.6
TIMBER & PAPER AND PUBLISHING	212.5	244.4	257.2	292.2	273.6	289.5	324.1	309.9	347.8	392.1	403.5	396.8
INTERMODAL WHOLESALE	228.9	372.0	392.9	419.4	403.9	419.1	470.7	534.8	637.1	728.5	811.0	779.3
Consolidation, AFR trade & Other	1,072.6	764.9	825.0	707.8	565.7	369.5	339.1	275.8	258.2	228.0	263.9	269.7
TOTAL GFB	4,744.6	5,556.4	5,977.0	6,281.3	6,197.6	6,234.4	6,794.2	6,916.5	7,574.0	8,547.8	9,349.3	9,638.8
GRAND TOTAL	6,175.7	7,587.4	8,192.9	8,711.8	8,850.2	8,866.1	9,800.6	10,274.1	11,050.1	12,204.5	13,236.5	13,831.5

Source: Spoornet

* Note: 1991 and 1995 are taken from a different Spoornet sources than 1996-2005. Numbers differ very slightly.

Because detailed data for the Consolidation category differed, the single entry "Consolidation, AFR trade and Other contains all commodities not otherwise specifically delineated.

Table 8: Percent of Revenue

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	21.6	22.7	23.1	23.3	24.6	24.8	24.3	24.1	23.6	24.1	23.1	23.3
IRON ORE EXPORT LINE	1.6	4.1	3.9	4.6	5.4	4.9	6.3	8.6	7.8	5.9	6.3	7.0
MANGANESE	3.2	3.6	3.9	4.5	4.4	4.5	4.5	4.4	5.1	5.5	6.1	5.6
GRANITE AND ASBESTOS	0.7	0.9	1.1	1.1	1.0	1.2	1.3	1.2	1.1	0.7	0.6	0.6
COAL	2.2	4.3	4.1	4.7	5.1	5.2	5.2	5.2	5.6	6.3	5.3	5.6
CHROME	2.8	4.5	4.3	4.9	4.8	5.2	5.2	4.2	3.8	3.8	3.7	3.7
NON-FERROUS METALS	0.6	0.5	0.6	0.7	1.0	1.1	1.1	1.3	1.0	0.9	0.7	0.6
MINERAL MINING	1.9	2.2	1.3	1.5	1.7	1.9	1.8	1.8	1.7	1.7	2.1	2.4
FUEL AND PETROLEUM	5.2	4.6	4.7	4.2	4.2	4.8	4.4	4.0	3.7	3.7	4.0	4.0
CHEMICALS	3.9	3.9	3.1	3.3	3.3	3.5	3.7	3.2	2.8	3.0	2.7	2.6
FERTILIZER	1.8	2.3	3.8	3.4	4.1	4.4	3.2	3.4	3.7	3.0	3.1	2.9
CEMENT & LIME	4.9	5.7	5.3	5.2	4.9	5.0	4.9	5.0	5.2	5.5	6.3	6.4
IRON & STEEL AND SCRAP	16.1	15.5	15.2	14.8	14.0	13.7	13.7	14.6	15.6	16.8	17.2	16.4
FMCG	3.2	1.9	1.9	2.0	2.0	2.4	2.5	2.0	1.9	1.8	1.6	1.7
AUTOMOTIVE AND INDUSTRIAL	0.3	0.2	0.3	0.5	0.8	0.8	1.0	0.9	0.9	1.1	1.1	1.4
GRAIN & STOCKFEED AND MILLING	5.4	4.8	5.4	5.0	4.6	4.6	5.2	5.1	5.2	5.0	4.8	5.4
TIMBER & PAPER AND PUBLISHING	3.4	3.2	3.1	3.4	3.1	3.3	3.3	3.0	3.1	3.2	3.0	2.9
INTERMODAL WHOLESALE	3.7	4.9	4.8	4.8	4.6	4.7	4.8	5.2	5.8	6.0	6.1	5.6
Consolidation, AFR trade & Other	17.4	10.1	10.1	8.1	6.4	4.2	3.5	2.7	2.3	1.9	2.0	1.9
TOTAL GFB	76.8	73.2	73.0	72.1	70.0	70.3	69.3	67.3	68.5	70.0	70.6	69.7
GRAND TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9: Average Length of Haul (km)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	545	545	553	559	565	565	562	566	568	571	574	574
IRON ORE EXPORT LINE	866	882	881	882	881	880	881	880	881	882	882	881
MANGANESE	742	793	794	835	818	816	828	844	848	873	915	910
GRANITE AND ASBESTOS	566	910	931	911	882	902	873	814	785	772	760	773
COAL	385	535	437	412	440	457	509	470	454	412	408	445
CHROME	520	549	577	606	622	594	599	577	553	557	574	621
NON-FERROUS METALS	266	195	133	106	108	85	114	127	240	180	196	218
MINERAL MINING	501	497	228	256	284	302	329	333	330	344	346	330
FUEL AND PETROLEUM	338	404	441	430	413	406	395	451	406	416	458	476
CHEMICALS	439	428	410	428	419	417	559	549	582	569	555	510
FERTILIZER	536	602	712	721	740	751	777	800	832	826	826	856
CEMENT & LIME	377	403	399	412	427	412	420	413	397	404	411	396
IRON & STEEL AND SCRAP	489	474	493	495	526	542	558	554	567	579	581	572
FMCG	358	386	383	361	373	406	365	445	387	421	398	389
AUTOMOTIVE AND INDUSTRIAL	379	861	818	876	1,012	933	713	899	949	922	971	934
GRAIN & STOCKFEED AND MILLING	421	385	451	429	435	385	505	511	503	487	505	545
TIMBER & PAPER AND PUBLISHING	410	378	396	390	394	399	395	386	371	333	326	328
INTERMODAL WHOLESALE	539	637	808	808	771	782	804	794	785	734	824	808
Consolidation, AFR trade & Other	488	472	463	454	402	383	353	336	317	349	285	322
TOTAL GFB	459	475	486	482	487	486	508	510	518	514	525	527
GRAND TOTAL	522	550	553	555	562	561	576	583	588	590	599	602

Table 10: Revenue per Tonne-Km (Current Rand)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	0.0498	0.0532	0.0557	0.0575	0.0595	0.0612	0.0635	0.0675	0.0713	0.0782	0.0796	0.0815
IRON ORE EXPORT LINE	0.0075	0.0157	0.0182	0.0203	0.0245	0.0231	0.0296	0.0388	0.0393	0.0303	0.0333	0.0373
MANGANESE	0.0857	0.0845	0.0892	0.0901	0.0956	0.0998	0.1058	0.1160	0.1343	0.1460	0.1503	0.1653
GRANITE AND ASBESTOS	0.1461	0.1073	0.1169	0.1203	0.1260	0.1281	0.1450	0.1699	0.1874	0.2032	0.2120	0.2121
COAL	0.0807	0.0942	0.1058	0.1077	0.1085	0.1103	0.1122	0.1255	0.1421	0.1762	0.1942	0.1934
CHROME	0.1006	0.1174	0.1266	0.1332	0.1397	0.1460	0.1481	0.1535	0.1692	0.1827	0.1949	0.1996
NON-FERROUS METALS	0.1087	0.1266	0.1408	0.1452	0.1850	0.2520	0.2303	0.2743	0.2597	0.2849	0.2090	0.2131
MINERAL MINING	0.0564	0.0715	0.1494	0.1551	0.1596	0.1619	0.1653	0.1748	0.1843	0.2139	0.2394	0.2549
FUEL AND PETROLEUM	0.1670	0.1608	0.1621	0.1741	0.2015	0.2361	0.2616	0.2534	0.2964	0.3071	0.3582	0.3830
CHEMICALS	0.1185	0.1549	0.1620	0.1685	0.1757	0.1832	0.1899	0.1991	0.2323	0.2647	0.2919	0.3067
FERTILIZER	0.1044	0.1173	0.0967	0.0982	0.1092	0.1132	0.1137	0.1309	0.1454	0.1444	0.1538	0.1498
CEMENT & LIME	0.1031	0.1276	0.1315	0.1321	0.1336	0.1315	0.1334	0.1439	0.1578	0.1767	0.1969	0.2167
IRON & STEEL AND SCRAP	0.0749	0.0978	0.1022	0.1075	0.1103	0.1122	0.1152	0.1248	0.1402	0.1563	0.1737	0.1830
FMCG	0.1688	0.1776	0.1572	0.1684	0.1686	0.1636	0.2020	0.1779	0.1999	0.2113	0.2341	0.2542
AUTOMOTIVE AND INDUSTRIAL	0.3272	0.4358	0.4118	0.4331	0.4353	0.5510	3.4578	5.9085	0.8085	0.7007	0.6711	0.7446
GRAIN & STOCKFEED AND MILLING	0.1111	0.1468	0.1505	0.1534	0.1473	0.1590	0.1523	0.1615	0.1901	0.2151	0.2418	0.2408
TIMBER & PAPER AND PUBLISHING	0.0984	0.1243	0.1265	0.1286	0.1304	0.1291	0.1277	0.1321	0.1490	0.1901	0.2151	0.2231
INTERMODAL WHOLESALE	0.9021	0.8769	0.1391	0.1473	0.1540	0.1610	0.1764	0.1901	0.2372	0.3110	0.3205	0.3445
Consolidation, AFR trade & Other	0.1138	0.1542	0.1623	0.1730	0.1783	0.1728	0.1595	0.1729	0.2107	0.2381	0.3600	0.3628
TOTAL GFB	0.1036	0.1246	0.1247	0.1285	0.1328	0.1367	0.1414	0.1503	0.1681	0.1893	0.2069	0.2181
GRAND TOTAL	0.0722	0.0786	0.0822	0.0839	0.0862	0.0883	0.0919	0.0975	0.1065	0.1146	0.1220	0.1261

Table 11: Revenue per Tonne-Km (Constant 2005 Rand)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	0.1576	0.1074	0.1040	0.0995	0.0955	0.0917	0.0874	0.0864	0.0826	0.0867	0.0835	0.0815
IRON ORE EXPORT LINE	0.0238	0.0318	0.0340	0.0351	0.0394	0.0346	0.0408	0.0496	0.0455	0.0335	0.0350	0.0373
MANGANESE	0.2709	0.1706	0.1666	0.1558	0.1534	0.1495	0.1458	0.1485	0.1555	0.1618	0.1578	0.1653
GRANITE AND ASBESTOS	0.4621	0.2168	0.2186	0.2080	0.2023	0.1921	0.1997	0.2174	0.2169	0.2252	0.2226	0.2121
COAL	0.2553	0.1904	0.1977	0.1862	0.1741	0.1653	0.1546	0.1606	0.1645	0.1954	0.2038	0.1934
CHROME	0.3180	0.2371	0.2366	0.2303	0.2242	0.2188	0.2041	0.1964	0.1959	0.2025	0.2047	0.1996
NON-FERROUS METALS	0.3437	0.2557	0.2631	0.2510	0.2969	0.3778	0.3173	0.3509	0.3006	0.3158	0.2194	0.2131
MINERAL MINING	0.1784	0.1445	0.2792	0.2682	0.2562	0.2427	0.2277	0.2236	0.2134	0.2371	0.2513	0.2549
FUEL AND PETROLEUM	0.5282	0.3248	0.3029	0.3010	0.3234	0.3539	0.3604	0.3243	0.3431	0.3404	0.3761	0.3830
CHEMICALS	0.3746	0.3129	0.3028	0.2912	0.2820	0.2746	0.2617	0.2547	0.2690	0.2934	0.3065	0.3067
FERTILIZER	0.3302	0.2369	0.1806	0.1697	0.1752	0.1697	0.1566	0.1675	0.1684	0.1601	0.1615	0.1498
CEMENT & LIME	0.3261	0.2577	0.2458	0.2284	0.2144	0.1971	0.1837	0.1842	0.1827	0.1959	0.2067	0.2167
IRON & STEEL AND SCRAP	0.2369	0.1975	0.1909	0.1858	0.1771	0.1681	0.1587	0.1597	0.1623	0.1732	0.1823	0.1830
FMCG	0.5339	0.3587	0.2938	0.2911	0.2706	0.2452	0.2783	0.2276	0.2314	0.2343	0.2458	0.2542
AUTOMOTIVE AND INDUSTRIAL	1.0348	0.8803	0.7696	0.7487	0.6986	0.8259	4.7634	7.5598	0.9361	0.7768	0.7045	0.7446
GRAIN & STOCKFEED AND MILLING	0.3515	0.2965	0.2812	0.2652	0.2364	0.2384	0.2097	0.2066	0.2201	0.2384	0.2539	0.2408
TIMBER & PAPER AND PUBLISHING	0.3112	0.2512	0.2363	0.2223	0.2094	0.1934	0.1759	0.1690	0.1725	0.2108	0.2258	0.2231
INTERMODAL WHOLESALE	2.8530	1.7713	0.2599	0.2547	0.2471	0.2414	0.2431	0.2433	0.2746	0.3447	0.3365	0.3445
Consolidation, AFR trade & Other	0.3598	0.3114	0.3033	0.2990	0.2862	0.2590	0.2198	0.2213	0.2439	0.2639	0.3780	0.3628
TOTAL GFB	0.3276	0.2517	0.2330	0.2222	0.2131	0.2048	0.1948	0.1924	0.1946	0.2098	0.2172	0.2181
GRAND TOTAL	0.2282	0.1587	0.1536	0.1451	0.1383	0.1324	0.1266	0.1247	0.1234	0.1270	0.1281	0.1261
GDP DEFLATORS (2005=100)	316.2	202.003	186.884	172.872	160.495	149.893	137.758	127.948	115.782	110.857	104.985	100

Source: World Bank Development Indicators

Table 12: Revenue per Tonne-Km (Official US \$)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	0.0571	0.0296	0.0242	0.0216	0.0173	0.0150	0.0126	0.0100	0.0078	0.0115	0.0129	0.0128
IRON ORE EXPORT LINE	0.0086	0.0088	0.0079	0.0076	0.0071	0.0057	0.0059	0.0058	0.0043	0.0044	0.0054	0.0059
MANGANESE	0.0981	0.0470	0.0388	0.0338	0.0278	0.0245	0.0210	0.0172	0.0148	0.0214	0.0244	0.0260
GRANITE AND ASBESTOS	0.1674	0.0598	0.0508	0.0451	0.0366	0.0314	0.0288	0.0253	0.0206	0.0298	0.0345	0.0334
COAL	0.0925	0.0525	0.0460	0.0404	0.0315	0.0271	0.0223	0.0187	0.0156	0.0258	0.0316	0.0304
CHROME	0.1152	0.0654	0.0550	0.0500	0.0406	0.0358	0.0294	0.0228	0.0186	0.0268	0.0317	0.0314
NON-FERROUS METALS	0.1245	0.0705	0.0612	0.0545	0.0537	0.0618	0.0457	0.0408	0.0285	0.0418	0.0340	0.0335
MINERAL MINING	0.0646	0.0398	0.0649	0.0582	0.0463	0.0397	0.0328	0.0260	0.0202	0.0313	0.0389	0.0401
FUEL AND PETROLEUM	0.1913	0.0895	0.0704	0.0653	0.0585	0.0579	0.0519	0.0377	0.0326	0.0450	0.0582	0.0602
CHEMICALS	0.1357	0.0863	0.0704	0.0632	0.0510	0.0449	0.0377	0.0296	0.0255	0.0388	0.0474	0.0482
FERTILIZER	0.1196	0.0653	0.0420	0.0368	0.0317	0.0278	0.0226	0.0195	0.0160	0.0212	0.0250	0.0236
CEMENT & LIME	0.1181	0.0710	0.0572	0.0496	0.0388	0.0323	0.0265	0.0214	0.0173	0.0259	0.0320	0.0341
IRON & STEEL AND SCRAP	0.0858	0.0545	0.0444	0.0403	0.0320	0.0275	0.0229	0.0185	0.0154	0.0229	0.0282	0.0288
FMCG	0.1934	0.0989	0.0683	0.0632	0.0490	0.0401	0.0401	0.0264	0.0220	0.0310	0.0380	0.0400
AUTOMOTIVE AND INDUSTRIAL	0.3748	0.2427	0.1790	0.1625	0.1264	0.1352	0.6864	0.8781	0.0888	0.1027	0.1091	0.1171
GRAIN & STOCKFEED AND MILLING	0.1273	0.0818	0.0654	0.0575	0.0428	0.0390	0.0302	0.0240	0.0209	0.0315	0.0393	0.0379
TIMBER & PAPER AND PUBLISHING	0.1127	0.0692	0.0550	0.0482	0.0379	0.0317	0.0253	0.0196	0.0164	0.0279	0.0350	0.0351
INTERMODAL WHOLESALE	1.0333	0.4884	0.0605	0.0553	0.0447	0.0395	0.0350	0.0283	0.0261	0.0456	0.0521	0.0542
Consolidation, AFR trade & Other	0.1303	0.0859	0.0705	0.0649	0.0518	0.0424	0.0317	0.0257	0.0231	0.0349	0.0585	0.0571
TOTAL GFB	0.1186	0.0694	0.0542	0.0482	0.0386	0.0335	0.0281	0.0223	0.0185	0.0277	0.0336	0.0343
GRAND TOTAL	0.0827	0.0438	0.0357	0.0315	0.0250	0.0217	0.0182	0.0145	0.0117	0.0168	0.0198	0.0198
Exchange Rate (Rand/US\$)	2.761	3.627	4.299	4.608	5.528	6.109	6.94	8.609	10.541	7.565	6.46	6.359

Source: World Bank Development Indicators

Table 13: Revenue per Tonne-Km (PPP\$)

	1991	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COAL EXPORT LINE	0.1364	0.0662	0.0559	0.0520	0.0463	0.0425	0.0382	0.0339	0.0297	0.0414	0.0393	0.0313
IRON ORE EXPORT LINE	0.0206	0.0196	0.0183	0.0183	0.0191	0.0160	0.0179	0.0195	0.0163	0.0160	0.0165	0.0143
MANGANESE	0.2345	0.1052	0.0896	0.0814	0.0745	0.0693	0.0638	0.0583	0.0559	0.0773	0.0743	0.0635
GRANITE AND ASBESTOS	0.4000	0.1336	0.1175	0.1087	0.0982	0.0890	0.0874	0.0854	0.0780	0.1076	0.1048	0.0815
COAL	0.2210	0.1173	0.1063	0.0973	0.0845	0.0766	0.0676	0.0631	0.0592	0.0934	0.0960	0.0743
CHROME	0.2753	0.1461	0.1272	0.1203	0.1088	0.1014	0.0893	0.0772	0.0704	0.0968	0.0963	0.0767
NON-FERROUS METALS	0.2975	0.1576	0.1414	0.1311	0.1441	0.1751	0.1388	0.1378	0.1081	0.1509	0.1033	0.0819
MINERAL MINING	0.1544	0.0890	0.1501	0.1401	0.1243	0.1125	0.0996	0.0878	0.0767	0.1133	0.1183	0.0980
FUEL AND PETROLEUM	0.4573	0.2002	0.1628	0.1573	0.1570	0.1640	0.1576	0.1274	0.1234	0.1627	0.1770	0.1472
CHEMICALS	0.3243	0.1928	0.1628	0.1522	0.1368	0.1273	0.1145	0.1001	0.0967	0.1402	0.1443	0.1178
FERTILIZER	0.2858	0.1460	0.0971	0.0887	0.0850	0.0787	0.0685	0.0658	0.0606	0.0765	0.0760	0.0576
CEMENT & LIME	0.2823	0.1588	0.1322	0.1194	0.1041	0.0914	0.0804	0.0723	0.0657	0.0936	0.0973	0.0833
IRON & STEEL AND SCRAP	0.2051	0.1217	0.1026	0.0971	0.0859	0.0779	0.0694	0.0627	0.0584	0.0828	0.0858	0.0703
FMCG	0.4621	0.2211	0.1580	0.1521	0.1313	0.1136	0.1217	0.0894	0.0832	0.1120	0.1157	0.0977
AUTOMOTIVE AND INDUSTRIAL	0.8958	0.5425	0.4137	0.3912	0.3390	0.3828	2.0839	2.9695	0.3367	0.3712	0.3316	0.2861
GRAIN & STOCKFEED AND MILLING	0.3043	0.1827	0.1512	0.1385	0.1148	0.1105	0.0918	0.0812	0.0792	0.1140	0.1195	0.0925
TIMBER & PAPER AND PUBLISHING	0.2694	0.1548	0.1270	0.1161	0.1016	0.0897	0.0769	0.0664	0.0620	0.1007	0.1063	0.0857
INTERMODAL WHOLESALE	2.4696	1.0916	0.1397	0.1331	0.1199	0.1119	0.1063	0.0956	0.0988	0.1647	0.1584	0.1324
Consolidation, AFR trade & Other	0.3115	0.1919	0.1630	0.1562	0.1389	0.1201	0.0961	0.0869	0.0877	0.1261	0.1779	0.1394
TOTAL GFB	0.2835	0.1551	0.1253	0.1161	0.1034	0.0950	0.0852	0.0756	0.0700	0.1003	0.1023	0.0838
GRAND TOTAL	0.1976	0.0978	0.0826	0.0758	0.0671	0.0614	0.0554	0.0490	0.0444	0.0607	0.0603	0.0484
Ratio: PPP \$ GNI to Official \$ GNI	2.39	2.24	2.31	2.41	2.68	2.83	3.04	3.38	3.79	3.62	3.04	2.44

Source: World Bank Development Indicators

Table 14: Brazil, US and Canadian Railways (2005)

	Rte KM	Locs	Freight Wagons	Staff	Tonnes (000)	Tonne-Km (000,000)	Revenue (million Reais)	Avg lgth of haul (km)	Rev per tonne-km (Reais)	Rev/tonne-km (official US\$ @ R\$2.434/US\$)	Rev/tonne-km (PPP \$ @ 2.379)	Tonne-km/km Line	Tonne-km/Wagon	Tonne-km/Loc	Tonne-km/Staff
Brazil EFVM (iron ore)	905	348	39,857	6,015	131,000	68,700	2,597	524	0.0378	0.0155	0.0369	75.9	1.72	197.4	11.4
Brazil EFC (iron ore)	892	119	8,316	3,483	80,600	69,500	1,525	862	0.0219	0.0090	0.0214	77.9	8.36	584.0	20.0
Brazil MRS (iron ore)	1,674	329	12,928	3,624	108,100	44,400	1,998	411	0.0450	0.0185	0.0440	26.5	3.43	135.0	12.3
							US\$ Millions		Rev per tonne-km (US\$)	Rev/tonne-km Official US \$	Rev/tonne - km (PPP \$)				
US Class I system	153,787	23,198	1,290,000	162,438	1,723,000	2,478,914	46,118	1,439	0.0186	0.0186	0.0186	16.1	1.92	106.9	15.3
							CDN \$		Rev per tonne-km (C\$)	Rev/tonne-km Official US\$ at C\$1.212/US\$	PPP\$@0.99				
Canadian System	48,893	3,253	102,000	35,389	311,600	352,900	8,794	1,133	0.0249	0.0206	0.0203	7.2	3.46	108.5	10.0
Spoornet															
	Rte KM	Locs	Freight Wagons	Staff	Tonnes (000)	Tonne-Km (000,000)	Revenue (million Rand)	Avg lgth of haul (km)	Rev per tonne-km (Rand)	Rev/tonne-km (official US\$ @R6.36/US\$)	Rev/tonne-km (PPP \$ @ 2.44)	Tonne-km/km Line	Tonne-km/Wagon	Tonne-km/Loc	Tonne-km/Staff
Spoornet Export Iron Ore	880	90	2,961	2,772	29,628	26,084	974	880	0.0373	0.0059	0.0143	29.6	8.81	289.8	9.4
Spoornet Coal Ex Line	574	281	6,842	1,042	68,772	39,497	3,219	574	0.0815	0.0128	0.0313	68.8	5.77	140.6	37.9
Spoornet GFB system	20,247	2,340	86,050	29,653	83,837	44,184	9,639	527	0.2181	0.0343	0.0837	2.2	0.51	18.9	1.5

Sources: World Bank: Concessioned Railways Database, World Bank Railways Database, Spoornet, "Annual Divisional Report," pgs 52 and 60

Table 15: Comparison of US Class I and Spoornet Tariffs on Selected Major Commodities (2004)

Commodity	US Tariff (2004\$/t-km)	Spoornet Tariff (2004 PPP\$/ t-km)	US Length of Haul (km)	Spoornet Length of Haul (km)	Spoornet Tariff as percent of US Tariff
Coal	0.011	0.096	1,225	446	872.7
Coal Export	0.011	0.039	1,225	574	354.5
Iron Ore	0.019	0.016	633	879	84.2
Iron & Steel& Scrap	0.028	0.086	1,034	571	307.1
Petroleum	0.025	0.177	1,140	466	708.0
Timber, Paper & Pulp	0.032	0.106	1,651	327	331.3
Automotive and Industrial	0.076	0.328	1,486	933	431.6
Chemicals	0.026	0.144	1,438	509	553.8
Grain and stockfeed	0.016	0.123	1,570	474	768.8
Non-Ferrous Metals	0.023	0.136	444	116	591.3
These commodities represent 80.5 percent of US tonnes and 79.9 percent of Spoornet tonnes.					
Overall average	0.021	0.102	1330	602	485.7
Source: Table 13 and US STB, "Costed Waybill Statistics 2004"					

Figure 1: Spoornet Traffic and GDP (Index 2005=100)

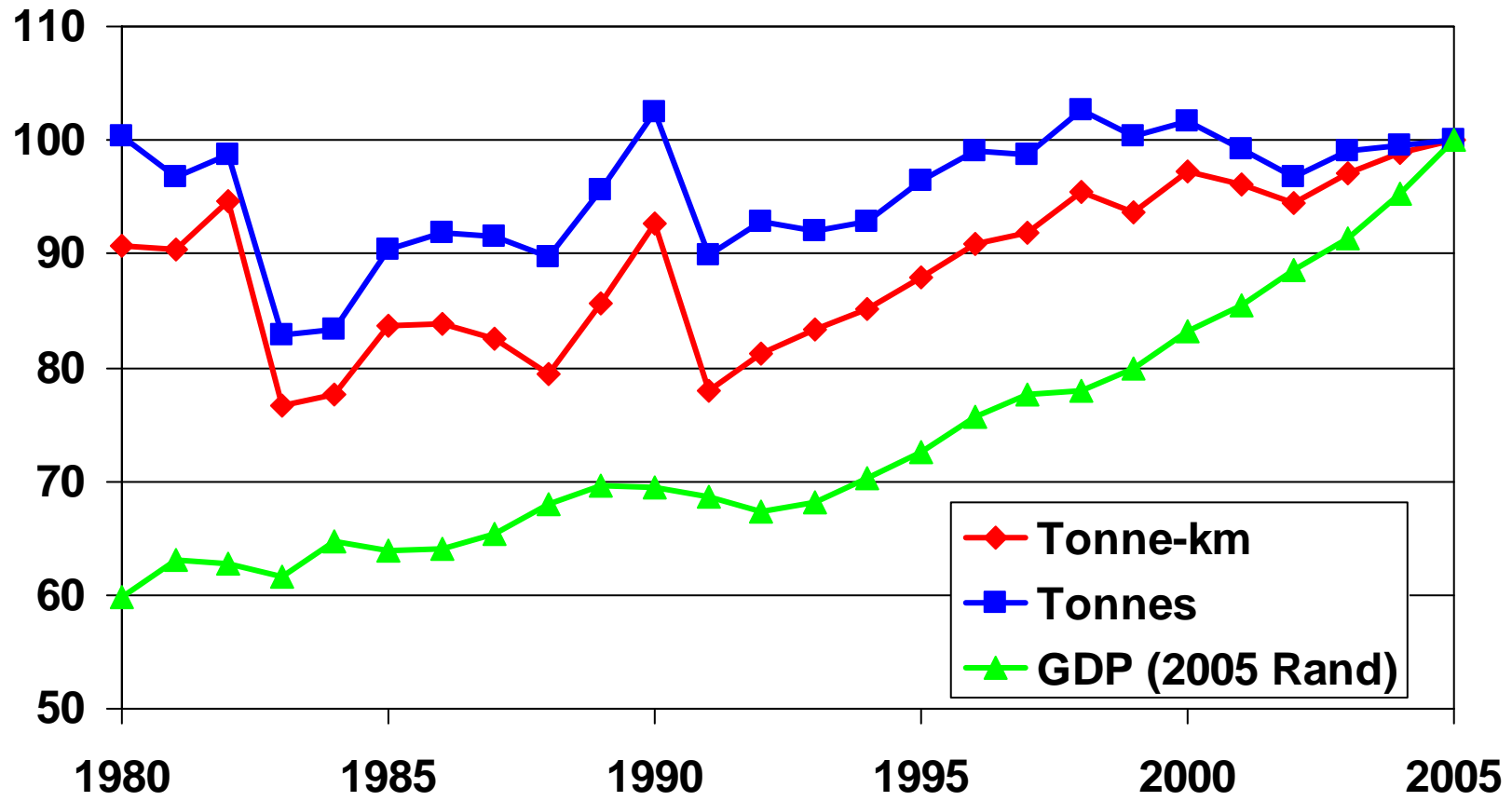
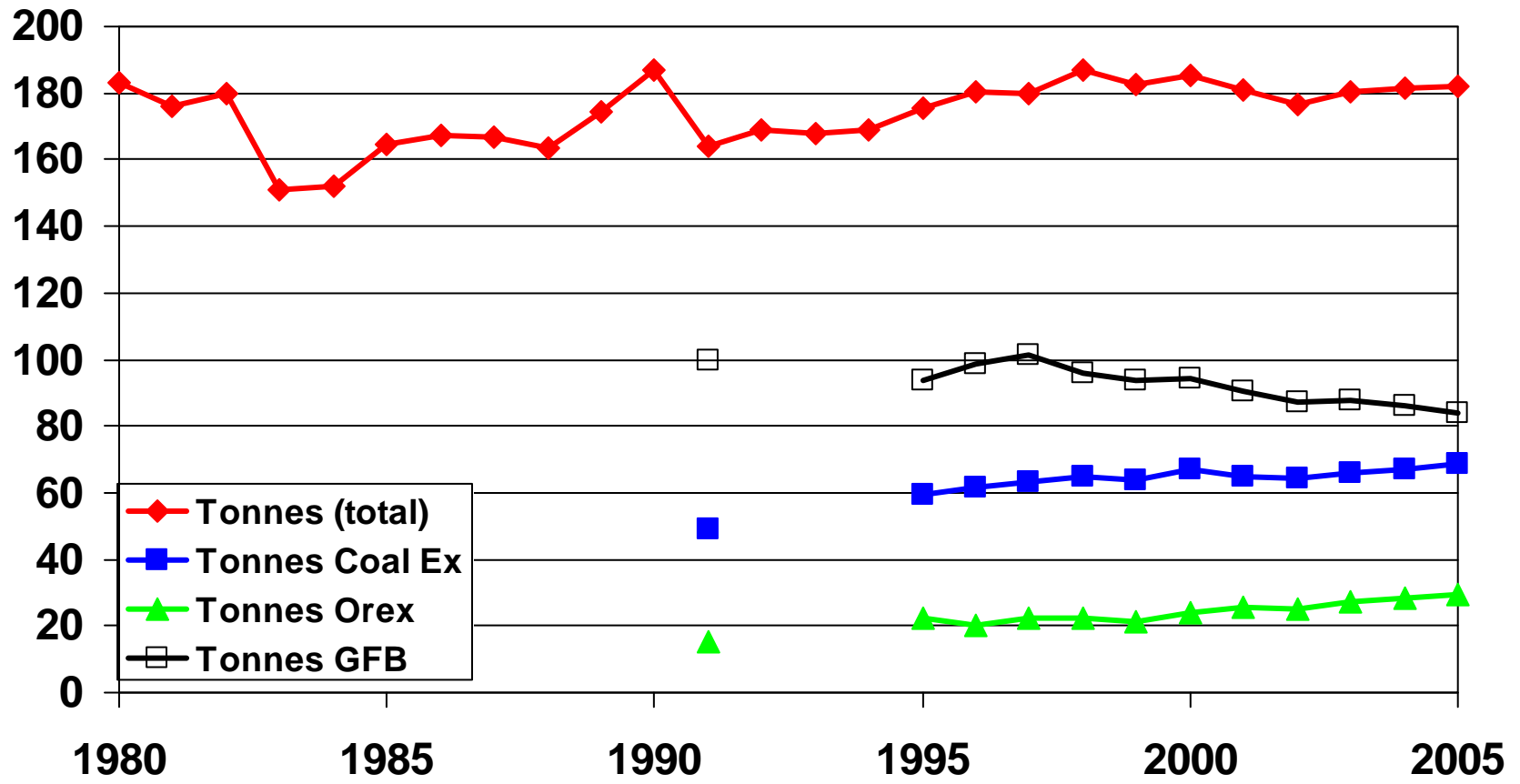
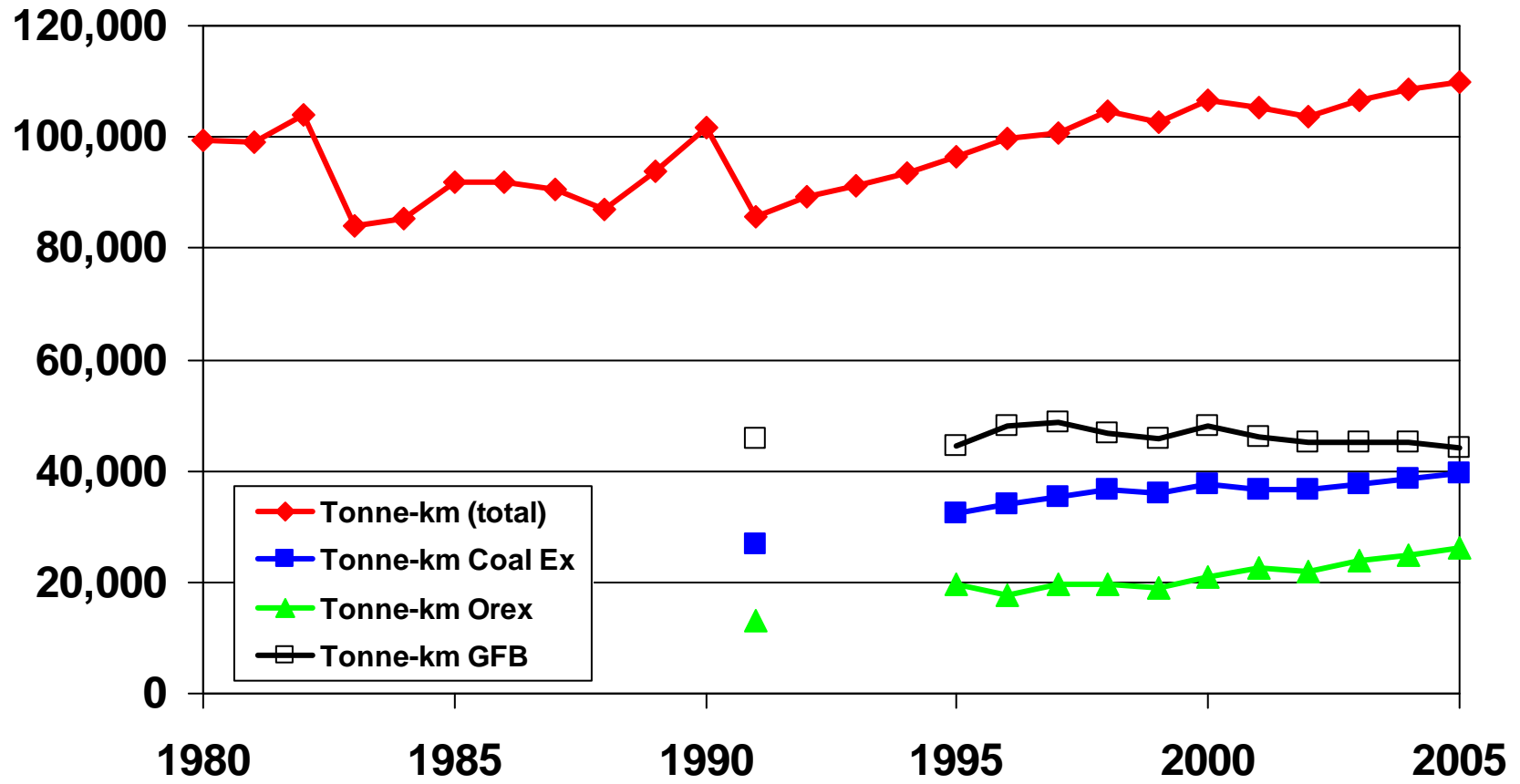


Figure 2: Spoonnet Tonnage by Market Group



Source: Table 3

Figure 3: Spoornet Tonne-km by Market Group



Source: Table 5

Figure 4:

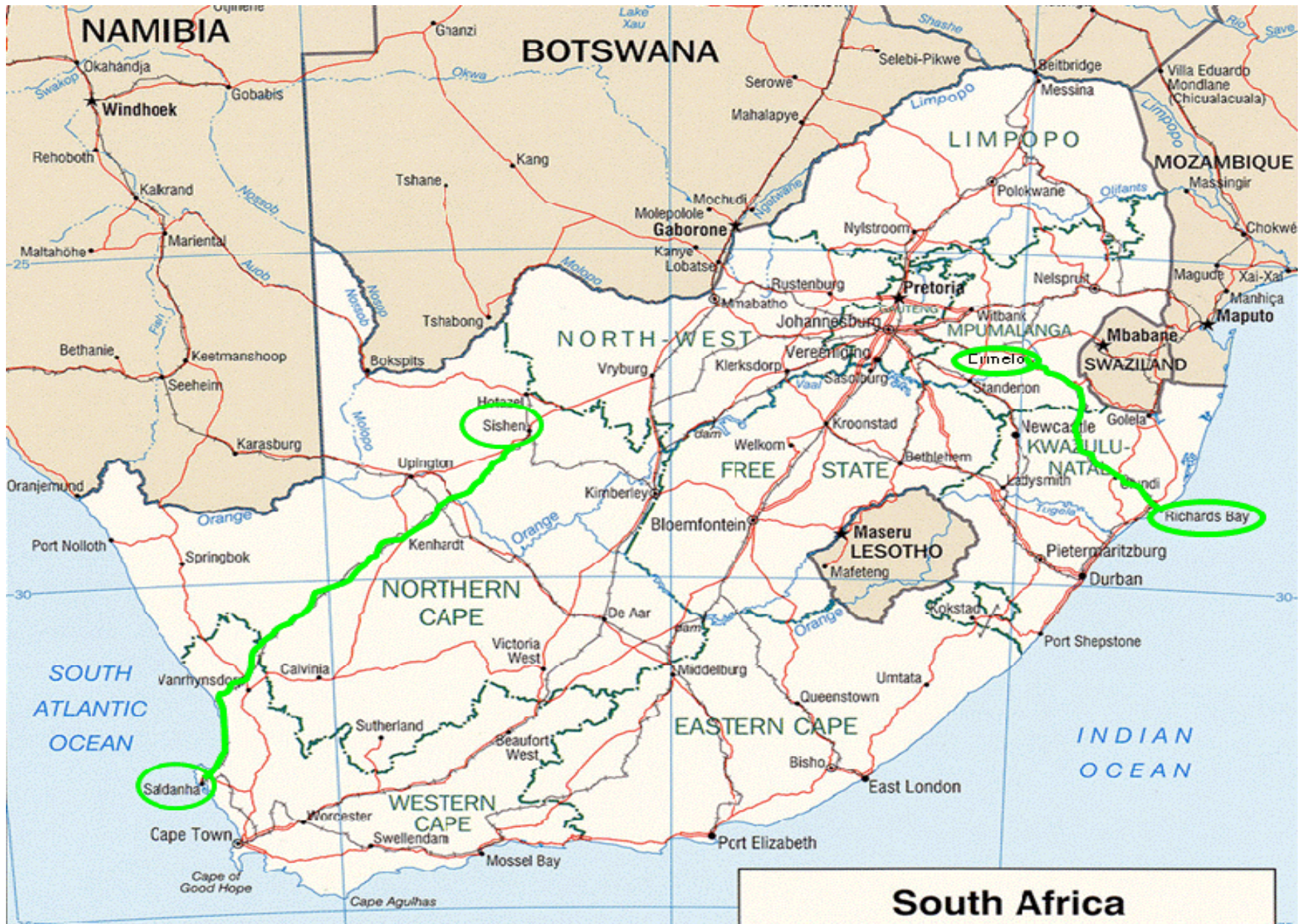
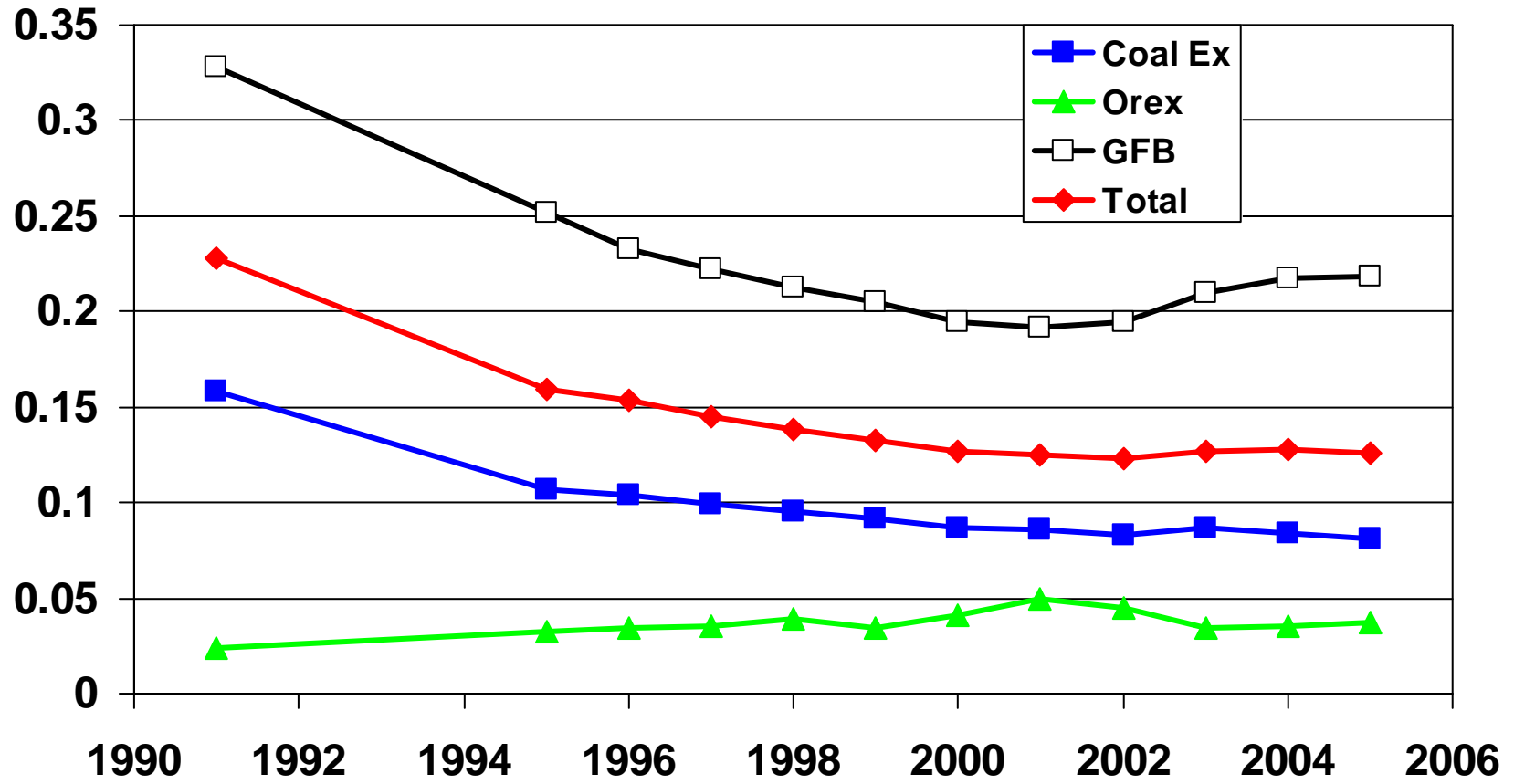
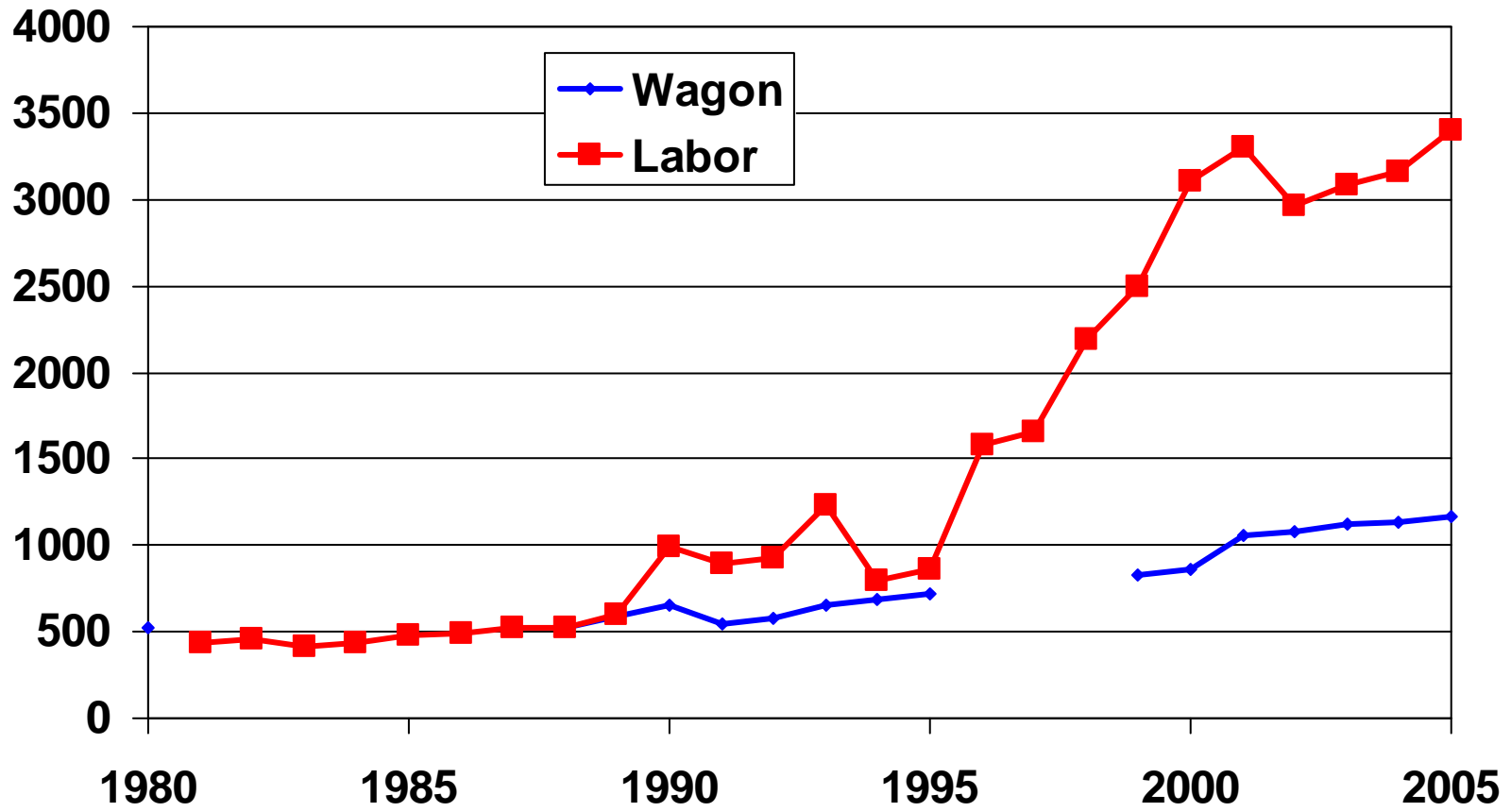


Figure 5: Spoornet Revenue/Net tonne-km (2005 Rand)



Source: Table 11

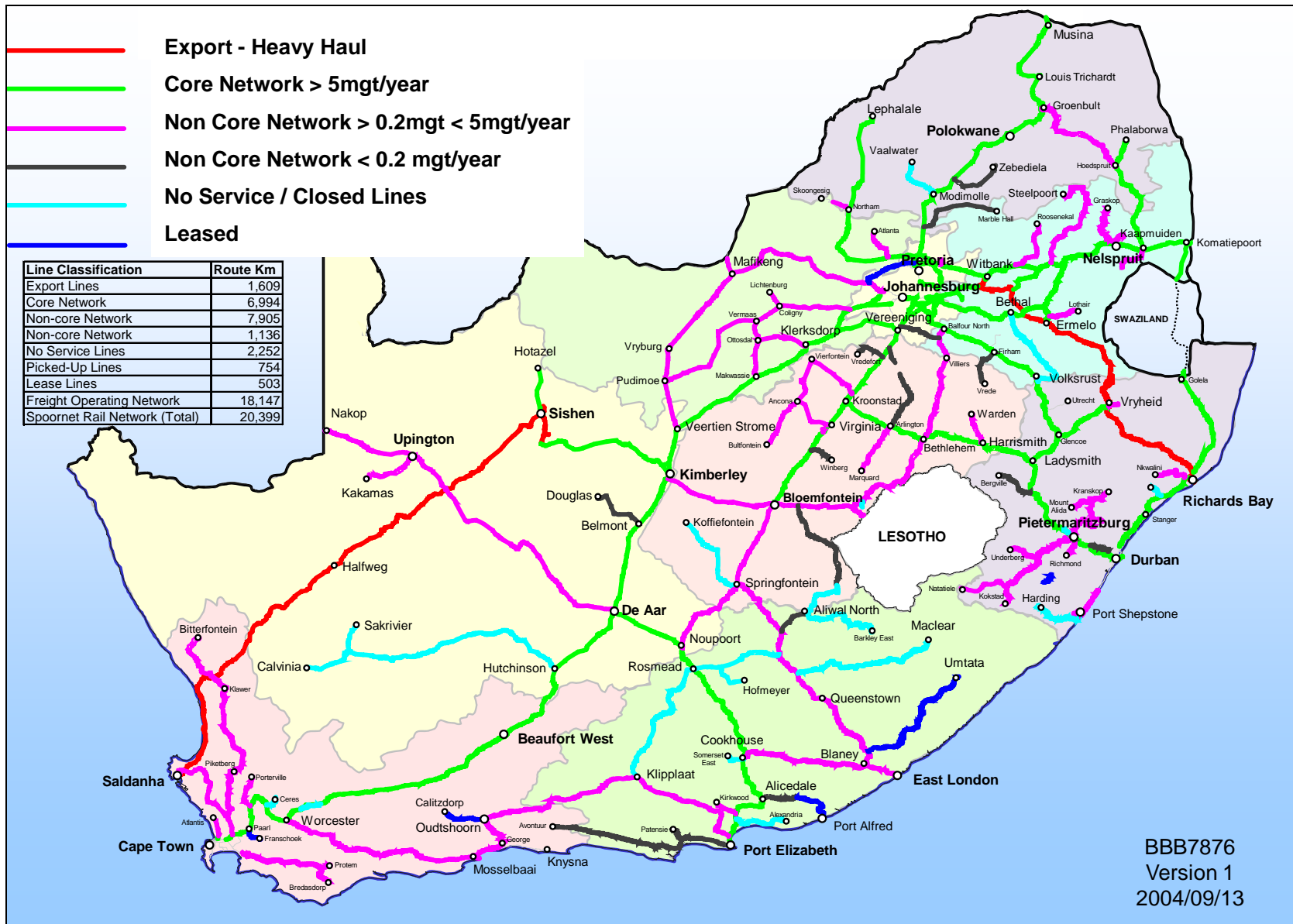
Figure 6: Trends in Wagon and Labor Productivity in Spoornet



Source: Spoornet

Note: data on wagon fleet for 1996-1998 not furnished

Figure 7: Spoornet - Line Classification by Line Density



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Source: Spoornet

Figure 8: Concentration of Spoornet's Traffic

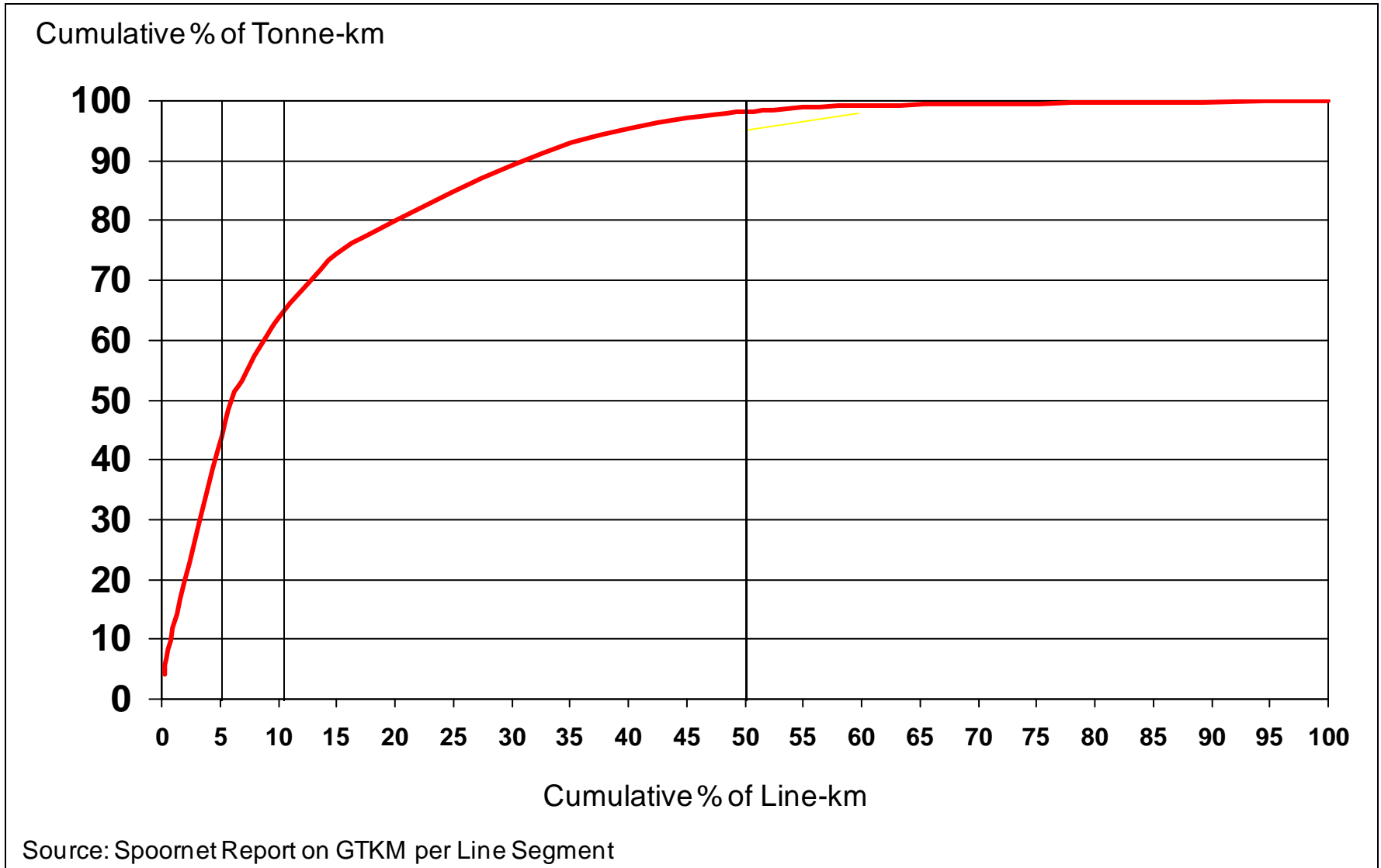
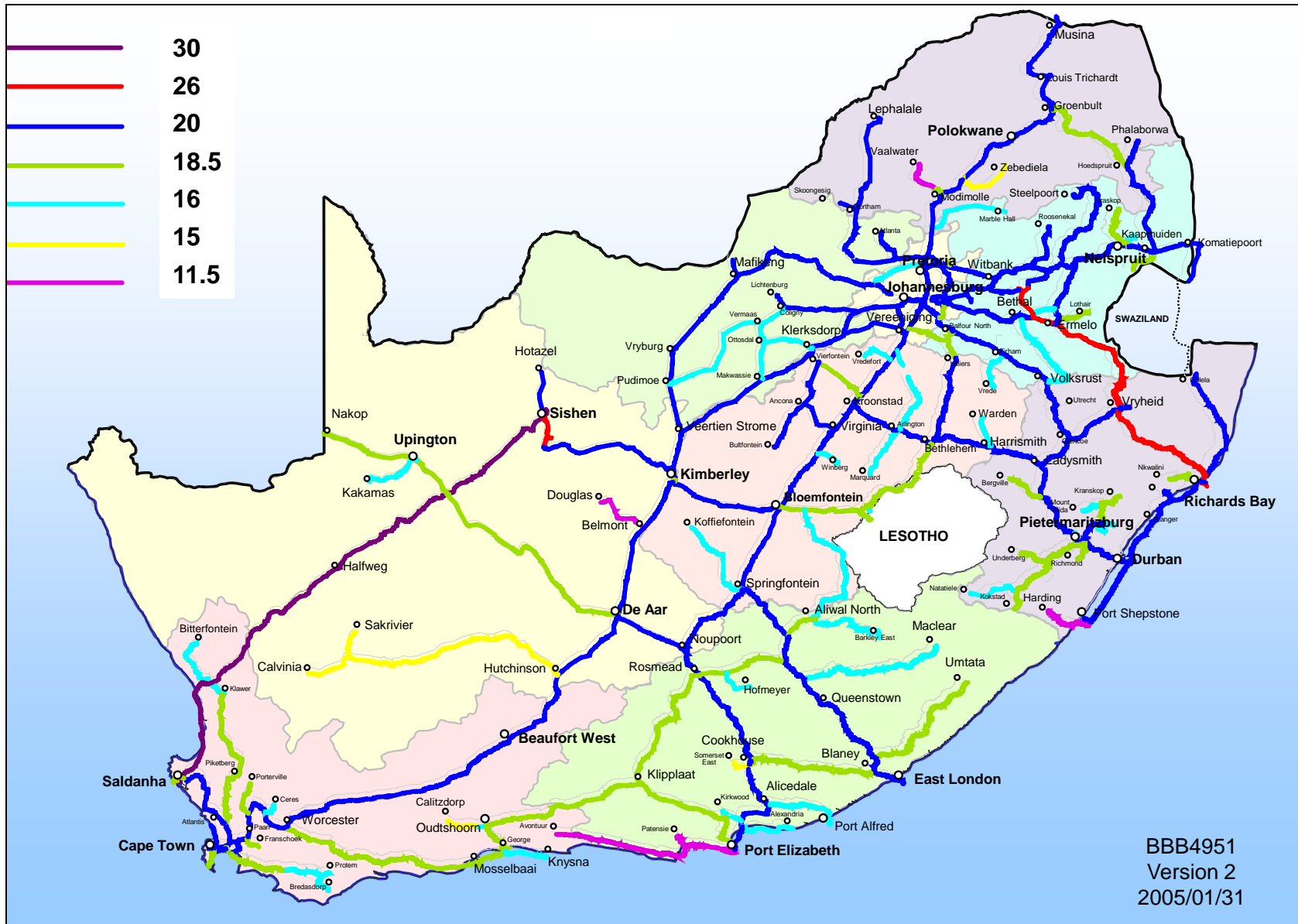
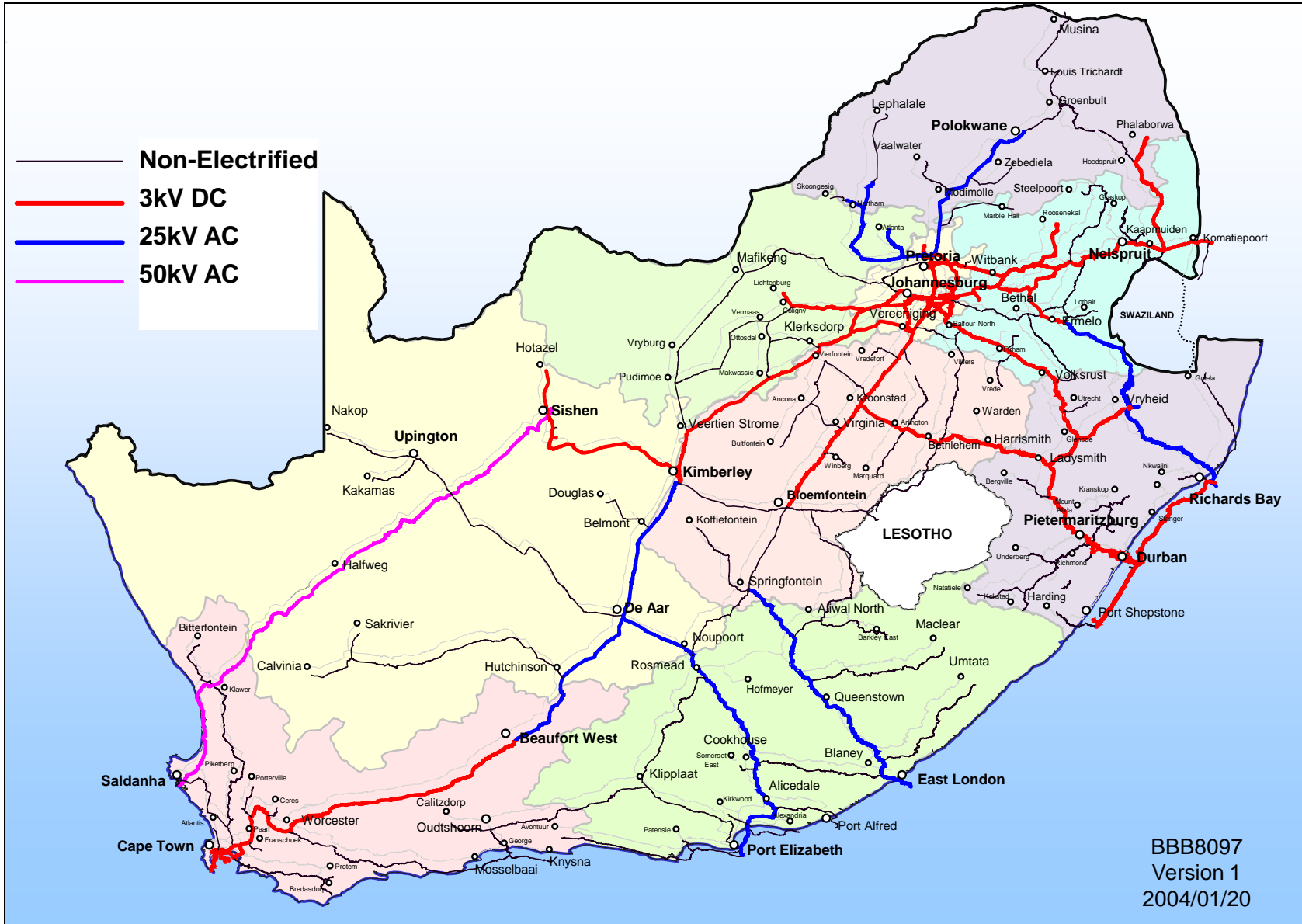


Figure 9: Maximum Axle Load (Tonnes)



Source: Spoornet

Figure 10: Electric Traction Voltages



Source: Spoornet

Figure 11: Railway Structure and Ownership Options

Structure	Ownership		
	Public	Partnership	Private
Integral (Monolithic)	China, India	Network Rail? India Railway Container Corp, Latin American freight and passenger concessions	Smaller US freight railroads, East Japan, Cantral Japan and West Japan
Dominant Operator Integral, tenant operators separated	Amtrak and VIA, Japan Rail Freight, Russia?	US freight and commuter railways in the NEC	US Freight railway trackage rights, JB Hunt
Separation	"Standard" EU model	Some UK franchises	Most UK franchises, Railtrack (but not Network Rail), EWS

Figure 12: Comparison of Transnet and NFLS Structures for Railways

Comparison of Transnet and NFLS Structures for Railways

	Competition	Structure	Regulation
Transnet	Intermodal only, primarily for GFB business, since OreEx and CoalEx are not truck competitive.	Monolithic and integral, including infrastructure, operations and rolling stock (ownership and maintenance)	Economic and safety "regulation" wholly internal to Transnet. Public reporting on consolidated basis only, with limited line of business or activity-based information
NFLS	Open access competition by public and private operators on the secondary network. Controlled, but non-discriminatory access on the primary network	Create primary and secondary networks. Access charges on primary network would create financing pool to support secondary network. Operators separated from infrastructure. Private ownership permitted of operators (that would be self-supporting). Leasing pool proposed for rolling stock on secondary network.	Three regulators: economic, safety and security. All institutionally separated from Transnet and Spoornet. Operator licensing would be required, as would determination and oversight of access charges. With increased competition, regulation of tariffs might be limited.