

PRASA: DELIVERING THE NATIONAL STRATEGIC PLAN

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ABSTRACT

The Passenger Rail Agency of South Africa (PRASA) has recently completed the update and reissue of its National Strategic Plan. The Plan presents a transformational, integrated and holistic approach to developing rail and long-distance bus services in South Africa which would provide an improved, integrated and effective service to the travelling public over the next forty years. It was developed through significant stakeholder-engagement and was designed to support stakeholders' development objectives. Innovative approaches to timetabling services which would relieve crowding and reduce journey times are adopted, so as to maximise the benefits from forthcoming major PRASA investment. Innovative interventions were developed, including light rail, to regenerate a city centre and new major rail corridors. The Plan lists specific priorities for change and investment along each of the nation's rail corridors, enabling the achievement of a future strategic vision for PRASA. From the earliest stages of the development of the Plan, there has been a strong focus on identifying organisational measures which would facilitate its delivery. This paper outlines the approach taken, and the resulting main issues, outcomes and priorities of the Plan.

Keywords: Innovation, corridor development, strategic plan, rolling stock, infrastructure provision, passenger rail, public transport, sustainable development, transport policy & stakeholder engagement.

1. INTRODUCTION

1.1 Background

Since its establishment in January 2009, PRASA has been working to deliver its mandate as government's primary agent for the delivery of public-transport services. Although the individual businesses (Metrorail, Shosholozza Meyl, Autopax and Intersite) had produced earlier individual strategic plans, PRASA wanted to develop a focussed plan, centred on its core rail business, which would bring the operating businesses closer together, so as better to serve the travelling public, going forward. Significant investment is planned by government in PRASA over the next decade; and the Strategic Plan is intended to provide a clear focus with which to optimise its use. The PRASA author of the report led the initiative which would create the strategy; and the Arup authors were responsible for its formulation.

The Strategic Plan provides a transformational, integrated and holistic approach to developing rail and other public transport services in South Africa over the next forty years up to 2050. It builds on the 2006 National Rail Plan, and widens the scope to include all PRASA's entities. It integrates the rail, bus/coach and real-estate businesses, so that they work together, combining so as to improve the services PRASA provides to the travelling

public. The Strategic Plan seeks to capitalise on the opportunity provided by planned government investment in new rolling stock, new signalling, stations, and three pilot Modernization Corridors; demonstrating the impact of an integrated approach to investment on rail corridors. The plan involves transformational change to the level of services delivered.

Considerable significance has been attached to the involvement of stakeholder groups, and the linking of PRASA's strategy with core public policy objectives across the country.

1.2 Aim of this paper

This paper explains the key elements of the Strategic Plan process. It examines the main issues it seeks to address; and sets out the outcomes and priorities it identifies for the future. It also describes the changes that must be made within PRASA so as to deliver this plan; as also the strategy with which to enable its delivery. Finally, it draws conclusions on the lessons learned from this process for strategic planning across the transport sector in the country.

2. APPROACH TO COMPLETING THE PLAN

PRASA had identified key objectives for its business direction. Right at the outset, at project mobilisation, the intended outputs of the Plan were clearly defined, these being:

- Clear focus on modal integration between rail, bus and taxi services, including interchange facilities and facilitators such as through ticketing;
- Revision of traditional corridors in order to make them appropriate for future travel patterns;
- Prioritised list of service and network expansion interventions, which would support traffic growth;
- Identification of opportunities for financial contributions from development gain, and local stakeholder funding; and
- Organisational changes needed by PRASA to deliver this Strategic Plan.

The outputs drove a three-staged development process, illustrated by Figure 1 overleaf. Separate plans were developed for 5 key areas, based on PRASA's key business focus: Gauteng, Western Cape, Eastern Cape, KZN, rural provinces, and long distance.

During Stage 1, reference was taken from national travel demand information, census data, and local development objectives, in formulating the definition of the **key strategic issues**. Major stakeholder meetings were held, involving provinces, municipalities and cities. This set the stage for interactive forums with key local stakeholders. PRASA will maintain these in order to develop the strategy over time. Strategic issues that prevent PRASA from delivering fully on its mandate and local service delivery concerns were also covered.

Stage 2 used two innovative evaluation techniques. Development objectives were identified and agreed with stakeholders. An **objectives-led approach** was used, ensuring that proposed interventions addressed key passenger and planning needs, and were not merely technology-led. A range of up to 100 delivery options was developed for each service corridor in each area, and then scored against the objectives establishing best fit. A **Strategic Option Evaluation Framework** was developed by PRASA's consultant Arup, in order to evaluate options. As a support option prioritisation, a software programme - DEFINITE (Institute For Environmental Studies, 2010) was used which electronically

prioritised and ranked the options or interventions. This assessment ensured that the most appropriate options were selected in each case. A key consideration was to challenge whether the current mode was the best. Another Arup-developed tool, the **Technology Choice Framework** (Figure 2) was used, identifying the key attributes of each transport mode at peak capacity. This was used to illustrate areas where rail could be substituted by bus, BRT or LRT, based on a mix of South African and worldwide experience.

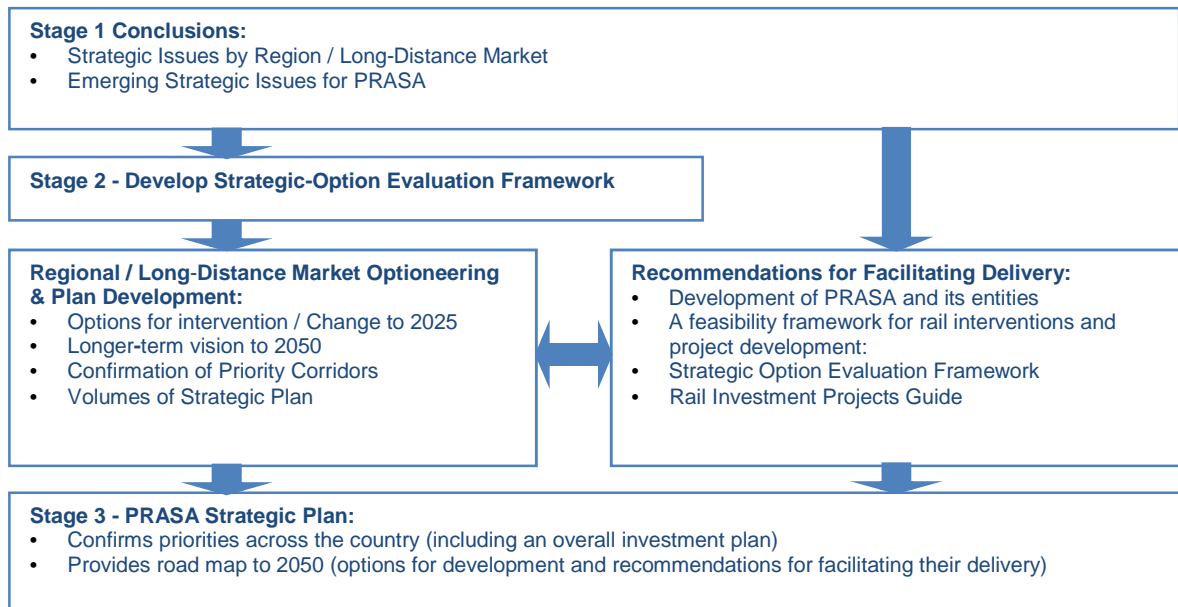


Figure 1: The strategic plan development process


	Commuter / Inter-urban travel	Implementation Timeframe	Peak capacity / hour	Maximum gradient	System life (years)	Unit carrying capacity	Infrastructure cost per km R million	Per passenger operating cost R/km
	Regular Buses	Short	2,500 – 6,000	13%	8 - 14	40 - 120	0.8 - 4	1.06
	Bus Rapid Transit (BRT)	Short / medium	4,000 – 10,000	13%	8 - 14	40 - 120	35 - 60	1.06
	Guided bus	Short / medium	4,000 – 10,000	13%	8 - 14	300 - 450	35 - 200	1.06
	Street Tram	Medium / long	12,000 – 20,000	10%	25 - 50	400 - 600	67 - 330	1.88
	Light Rapid Transit (LRT)	Medium / long	12,000 – 20,000	10%	25 - 50	400 - 600	67 - 330	1.88
	Tram Train	Medium / long	6,000 – 12,000	3% - 10%	25 - 50	400 - 600	67 - 330	1.88
	Heavy Rail	Long	20,000 – 60,000	3%	25 - 50	2,000 – 3,500	50 – 500	0.5 – 3.0

Figure 2: Technology Choice Framework

Stage 3 focussed on preparing the **National, Regional and Long-Distance & Other Provinces Strategic Plans** which set out the road map which would deliver the interventions identified.

3. FOCUS ON THE ROLE OF RAIL AND ROAD

Urban rail corridors have varied levels of usage, ranging from over 50,000 passengers per hour (Mabopane and Khayelitsha) to under 2,000 (Pinetown and Springs). International experience from the UK, Europe, ASIA and the USA demonstrate that rail is most efficient and effective when focussed on routes with large passenger flows, and high population or employment densities. Where this cannot be achieved; other modes are more effective. A key component of this is the provision of upgraded modal interchanges where taxi and bus services can operate radial feeder services. Electronic through-ticketing becomes essential; worldwide evidence shows that this overcomes the perceived disadvantages of changing modes.

There are no LRT systems in sub-Saharan Africa. The application to South Africa therefore requires careful consideration. However, the strategy foresees a role for PRASA operating LRT routes in KZN, Western Cape and Gauteng. These can provide high capacity corridors into development areas, at lower cost and within shorter lead time. They can also operate more effectively in constrained urban centres, or on street-running sections.

For long-distance operations, PRASA operates both road and rail services, with rail requiring financial support. The long-term strategy requires rail to operate at a much higher speed to be competitive, and again, the passenger volumes envisage concentration on key routes, with integrated bus feeder-services to support them, and to increase accessibility to smaller towns and rural provinces.

The process of determining these options was assisted by the Technological Choice Framework, by means of which informed decisions on appropriate technology could be made.

4. CURRENT NETWORK ISSUES AND THEIR RESOLUTION

PRASA's suburban rail services moved 530 million passengers in 2011 (more than any European country, except Germany, France or the UK) and made a major contribution to economic development and public mobility in Gauteng, Western Cape, Eastern Cape and KwaZulu-Natal. However, the quality of service-provision is a real problem which the Strategic Plan has to address, in order to provide a viable future for rail. Across the network, the Strategic Plan recognises that there is a series of common themes having a major impact on the services offered. Strategies to overcome these are identified:

- **Timetables are variable**, with few corridors operating trains at regular intervals. Higher-frequency standard interval 'clock-face' services are advocated, which would even out loading and make the services easier to use, especially at interchange points, where trains may be timed to connect properly. The new timetable generates service reliability benefits, particularly at junctions where regular margins can be planned.
- **Overcrowding** is a serious issue: this constrains market growth. More frequent services will address this. The new rolling stock on high-intensity corridors will be of greater length, providing greater capacity. Seating arrangements will be revised for longer-distance services which will reduce the need for passengers to stand for excessively long journey times.
- **Speeds are relatively slow**, with most rolling stock running at a maximum speed of 90 kph. The Strategic Plan requires that new stock be able to run faster. Signalling will be adjusted on renewal, in order to provide a maximum speed of between 120 and 160 kph on key corridors. Additional quadrupling of routes is envisaged, particularly in Gauteng

and the Western Cape. **Journey times are slow** on most corridors, compared with road transport. A principal cause is that most trains call at all stations en route. The new rolling stock does not offer much journey-time saving if this service pattern is retained. New timetables are planned which will split services, so that outer stations are served by trains which connect with an inner service at an interchange station, and then run nonstop to their destination. This is envisaged as a means of reducing journey times by up to 30%; also as a way of easing overcrowding issues. On 4 track routes, there will be a greater emphasis on 'fast' and 'slow' lines. In many instances there is still **poor integration** with other modes.

- **Light rail** provides an opportunity for conversion of lightly used rail routes, increasing their accessibility by running through urban centres. Major proposals are made in the Strategic Plan for an LRT system in Durban. Developments in the Western Cape and Gauteng are also outlined.
- On most corridors there is a relatively infrequent **off-peak service**. This makes poor use of rolling stock, and makes travel discretionary. Arup analysis demonstrated that if 2% of the total daily revenue could be earned in every off-peak hour, it would cover the marginal operating costs of providing a service frequency of around 50% of the peak frequency. Enhanced regular interval services will be offered outside the peaks on all routes. This is an instance where PRASA intends to lead the development of new travel markets in order to make the best use of the new rolling-stock investment.
- **Limited stop business express services** operate in Gauteng and Western Cape, but only by disrupting the basic train service, which would provide the special paths required. The special sets only make limited runs each day. Premium services have to cover their provision without additional revenue support, however, where justified, a premium service will be provided on one or more coaches on all services, providing better seating at lower densities, with enhanced service for a premium fare, while offering the benefits of faster journeys to all passengers.
- **Train interiors do not meet modern public transport standards**. Current Metro stock compares badly with road transport. The new rolling stock will last at least 30 years. It will be designed to a much higher standard. Trains will be air conditioned throughout, with improved lighting and seating for all passengers off-peak, and for peak passengers travelling over 30 minutes. Passenger security will be enhanced through the provision of CCTV, improved announcements, and better passenger information.
- **Ticketing** is limited and inflexible. Fraud is a serious problem; travel data is difficult to collect; and the current system does not incentivise regular users, off-peak travel, or modal transfer. Electronic ticketing is to be introduced as a high priority. Lower rate fares will be offered off-peak, which will help address overcrowding and encourage new markets. Linked with improved station access, this will have a major impact on improving passengers' travel experience, and on improving security. Creation of intermodal tickets is a high priority; and, although undoubtedly a thorny issue, PRASA intends engaging with the taxi industry so as to devise travel facilities that satisfy the needs of both parties.
- **Station facilities** need improvement, including provision of safe and secure environments and access for all users. Emphasis is being placed on better station design, with elimination of blind spots, and improved CCTV; also more visible station and security staff in order to reassure passengers. The quality of modal interchange facilities will be enhanced. This will encourage seamless transfer, and will widen the catchment area for core stations by connecting with high-quality local transport. PRASA is also responding to the high priority of all local authorities for improving access for mobility-impaired passengers.
- **Growing and emerging centres** are not always adequately connected to the railway network. This is usually for historic reasons. It is understood that rail development lags

behind urban growth. A radical step in the Western Cape and KZN will be to plan the creation at inception, of high-capacity rail facilities into new urban developments. Ways of securing funding from the developers themselves will be sought, which will overcome the budget constraints that PRASA inevitably works within. Elsewhere, there is a growing emphasis on completing projected extensions, which will serve existing developments where sufficient demand can be identified.

5. HOW THE PLAN IDENTIFIES THE PRIORITIES

The Strategic Plan has adopted a new visually based depiction of the proposals for each corridor. Each section of the Plan sets out exactly the way in which the network will be developed, including confirmation of the priorities; timescale for development; and the details of what will be delivered. In this way, PRASA has entered into a commitment with stakeholders and users, on how the business will develop over the next 40 years. Section 5 highlights some of the key priorities for investment. Selection of priorities also carefully considered the need to maximise the use of planned investment in PRASA's rolling stock, signalling and infrastructure.

5.1 The suburban rail network

The optioneering process uses the DEFINITE (Institute For Environmental Studies, 2010) outputs for identifying Priority Corridors, where the returns on investment, measured financially, and in economic contribution to wider public goals, may be maximised. These corridors are being selected for the priority introduction of:

- New rolling stock which will provide the higher capacity needed to satisfy projected demand;
- Revised signalling which will reduce headways, improve reliability, and enhance line speeds;
- Improved passenger information systems, using real-time train-running data from the signalling system – both on stations and through the Internet;
- Improved track infrastructure aimed at improving reliability and network capacity, increasing of line speeds, and reduction of delays caused by trackside equipment failures, vandalism, etc.;
- Creation of new intermodal station facilities which will assist the transfer of passengers between train and bus, taxi, and bicycle; and
- Better station signage and passenger facilities, including access arrangements for mobility-impaired passengers, which will provide a transformation in the image and perception of PRASA services.

PRASA appreciates and is responding to the challenge laid down by Gautrain. Both networks provide inter-urban transport, and operate in the same way, however, the level of service provision and passenger perception is far apart. The corridor improvements are intended to help PRASA's services gain the same appreciation. A key lesson that the Strategic Plan process has helped PRASA to learn, is that much may be achieved by using existing assets more efficiently, without the need for major infrastructure changes. To express this clearly, the Plan for each region was presented using standard formats. Firstly, a network diagram was drawn up for each region, as shown by Figure 3. Key initiatives, such as linking corridors to provide a cross-city capability (for example in this case Randfontein – Springs and Leralla – Dube); and the splitting of semi-fast and short services (such as Vereeniging to Johannesburg, running fast from Midway, followed by a stopping service to Johannesburg) may be easily explained. Regular interval service

frequencies are also set out. Experience from the Plan development process has shown that this has been well received by stakeholders, with little or no technical rail knowledge, but who have a key public-transport mandate.

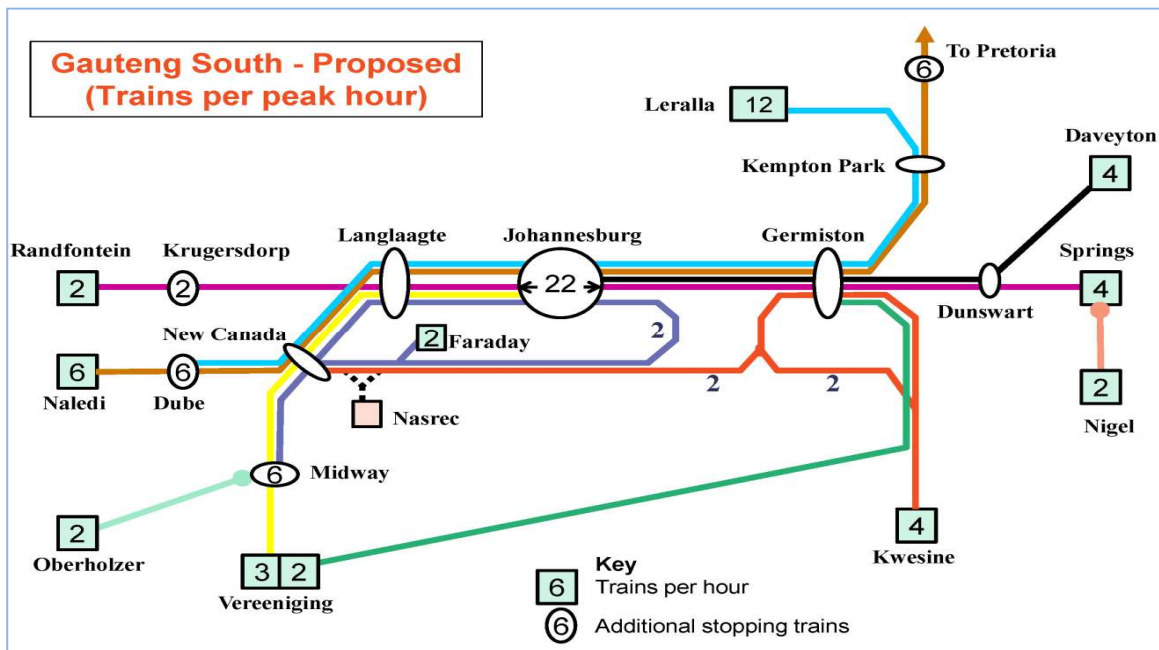


Figure 3: Network schematic map – timetable changes proposed for Gauteng South

Network schematics are supported by a Requirements Specification for each corridor as shown by Figure 4.

Description	Supporting Narrative	Priority	Timescale
Revised rail services	Incremental timetable enhancements to 12tph (peak) and 6tph (off peak) on each line, with a regular interval timetable. Trains to call at all intermediate stations. High-density seating provided, given the passenger numbers. Some trains would turn back short of the terminus	High	Quick win
Transport connections / station facilities	Focus on Philippi, Langa and Mutual for interchange improvements, because they have the highest footfall	High	Quick win
New services	None (unless other line extensions interface)	High	Quick win
New stations	Two new stations proposed near Philippi (subject to business case)	High	Quick win
Network capacity	Sufficient capacity exists. Additional bay platforms at Philippi, Chris Hani, and Kapteinsklip	High	Quick win

Figure 4: Requirements specification for Cape Town – Kapteinsklip & Chris Hani

Each table sets out the proposed train service (in all cases regular interval, with an off-peak frequency of around 50% of peak); locations for station improvements, and requirements for new stations, line extensions or capacity improvements. Prioritisation was provided by DEFINITE (Institute For Environmental Studies, 2010), while the timescale is a reflection of both the practicality of delivery, and the relative priority allocated.

5.2 Longer-distance services

PRASA runs both long-distance rail and bus services. The two have very different characteristics; however, continuing provision of rail services is a major challenge. The Strategic Plan identifies an overall strategy which would eventually transform inter-urban and longer-distance travel in the passenger market, including the following interventions.

Rationalisation and Business Turnaround: In the short term, the Plan initially focusses on responding to rail's existing challenges. Steps to be taken will include:

- Improving journey times by reducing station dwells, and improving punctuality. This involves considerable work with Transnet;
- Responding to market needs by focussing more on intermediate journeys;
- Producing a new Internet-based ticketing strategy which will improve revenue and customer data, and reduce fraud; and
- Improving financial results by a full-scale review of the business, including a rationalisation of the fleet, and focus on the more remunerative traffic flows.

Creating a long-distance integrated passenger business: In the longer term, Transnet and PRASA are identifying routes which become focussed on slow-speed heavy-haul operations; and higher-speed routes used for premium freight (containers and cars) and passenger. This will go a long way towards addressing reliability issues; it will also shorten journey times. The strategy includes:

- A longer-term goal of line speeds of 160 kph;
- Longer-term reintroduction of some cross-border services to Mozambique, Zimbabwe and Botswana;
- Using Autopax bus feeders with through-ticketing which will feed additional traffic into rail services and widen market coverage; and
- Using Autopax services in order to help grow demand on key corridors identified with a long-term rail potential.

Creating a South Coast Railway in the longer term: A key issue for rail is the relative lack of a chain of larger conurbations. One area with this potential and with poor road communications is the South Coast between Saldanha, Cape Town, Port Elizabeth, East London, Durban and Richards Bay. Growth projections suggest that demand may justify the development of a rail corridor in the longer term. This would support economic development in the Eastern Cape. A corridor would need to operate at over 200 kph and might be standard gauge. Transnet has similar proposals. The corridor would not be viable without some freight traffic. Timetabled bus services integrated with other PRASA services provide a shorter-term alternative so as to develop demand. The Plan recommends that a PRASA – Transnet team develop the South Coast Railway Corridor proposal further.

A High-Speed Rail Strategy: Arup analysis of projects in Europe and Asia confirms that High Speed Rail needs around 20,000 passengers per day and a distance of between 500 and 1,500 km, to be competitive with road and air. PRASA has identified two routes with sufficiently sized total travel markets – from Gauteng to Cape Town and to Durban, although neither yet meets the viability criteria. Eventual implementation will depend on long-term demand growth. Early identification of route corridors is essential to the safeguarding of future implementation and to identifying the way in which planning policy may support high-speed rail.

6. DEVELOPMENT PRIORITIES

PRASA is a key landholder: this provides significant potential for developing stations and other public facilities, funded through the provision of retail or office developments, in harmony with station provision, or by disposal of surplus landholdings.

The Strategic Plan foresees opportunities for using the rolling-stock strategy in order to replace stabling and maintenance facilities in city centres, with more appropriate out-of-town facilities, selling the sites for sympathetic development, which generates rail traffic. A number of stations (those with the highest footfall) are priorities for redevelopment, and the Intersite Strategy interlocks development opportunities with corridor needs.

7. DELIVERING THE PLAN

The plan is a fundamental review of all of PRASA's activities. It is a living document which will be updated in response to global and national developments. It aims to bring the business sectors together and to coordinate their individual objectives. It has been noteworthy for the degree to which the plan was built up, with the participation and support of key public-sector stakeholders; it is therefore important that this dialogue be maintained. In addition, it identifies a number of corporate changes that are needed in achieving this goal.

From the earliest stages of the development of the Strategic Plan, there has been a strong focus on identifying steps that must be taken within PRASA in facilitating its delivery. Figure 5 sets out a road map of actions that will be taken.

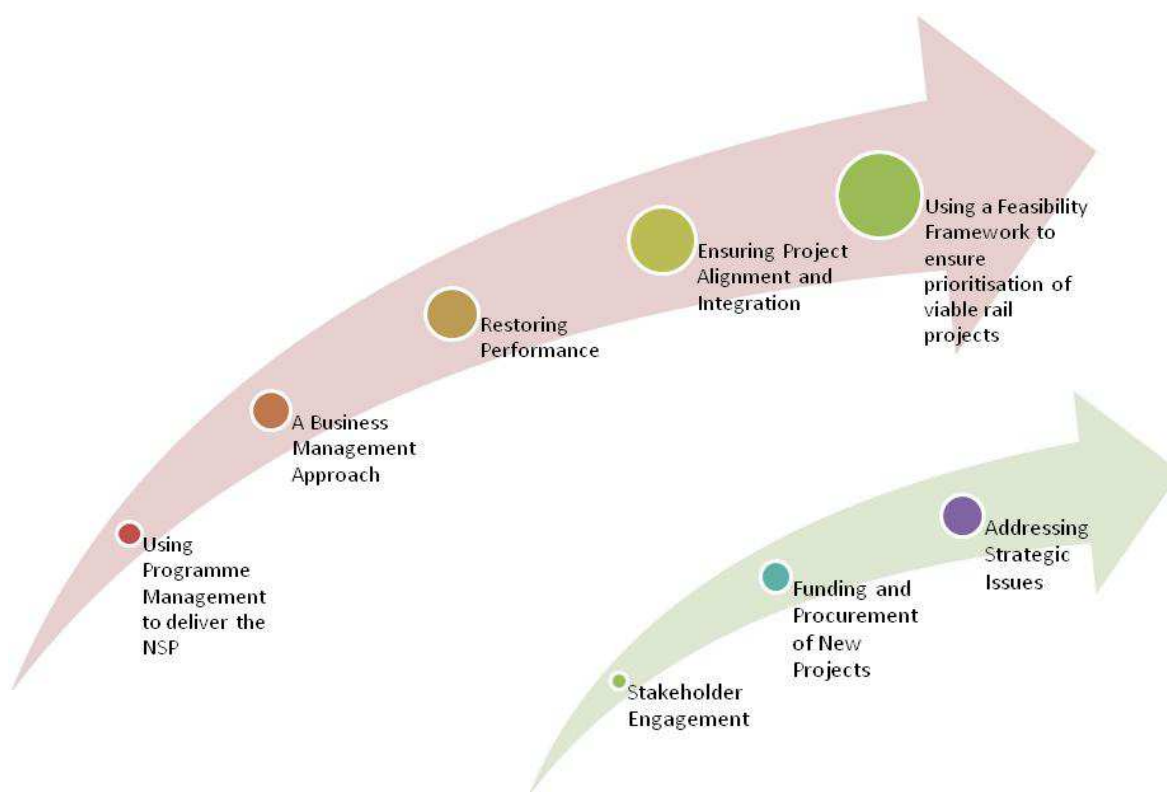


Figure 5: Delivering the NSP

- **Drive a short-term focus on restoring service reliability** – this is the key concern of stakeholder groups, following rolling-stock availability issues over the last 2 years;
- **Address timetabling, in order** to make service patterns more appropriate, to reduce journey times, and to address crowding issues;
- **Continue stakeholder engagement** on a regular basis, by means of the workshop structure used for plan development. This is essential in ensuring that the Plan remains relevant; and that it responds to political and developmental changes;

- **Developing market focus** through organisational change in creating route teams with delivery and revenue responsibility, and bottom line 'profit' accountability which would encourage a market-responsive management structure;
- **Encourage an entrepreneurial approach in order** to develop new ideas based on local or international experience, in areas such as service delivery, ticketing and pricing, customer care and local marketing;
- **Adopt local branding** of services, making them more appropriate to their specific environment; encouraging coordination with other local public-transport operators;
- **Encourage alignment of separate projects**, ensuring that outputs are coordinated (e.g. higher speed rolling stock needs improved track and signalling) so that the maximum benefit may be gained from the major investments now being formulated;
- **Prioritise investment** on the corridors with the greatest needs and payback. The DEFINITE (Institute For Environmental Studies, 2010) process has helped the Strategic Plan rank these priorities, and focus investment onto the key development corridors;
- **Encourage closer working with Transnet in order** to overcome the institutional difficulties caused by the split of freight and passenger operations over the last 10 years; and to improve the reliability issues that are affecting both operators; and
- **Clearly define PRASA's social responsibilities** and key objectives which would support economic and social well-being, focussing delivery priorities and informing the debate on national and local funding. At the moment these priorities are only implicitly stated.

8. CONCLUSIONS

The Strategic Plan has driven a debate within PRASA on how to make the best use of the major investment now being implemented, and how to respond to the challenges laid down by the Strategic Plan. This will develop over the next year as the changes start to take place. The paper has shown that deploying a prioritised, logical, and inherently strategic approach, can focus the development of an objectives-led transport strategy, based on effective and realistic options for change. Options do not always have to involve significant infrastructure development. They can focus on reorganising services in a more customer-orientated manner. Using the external-consultants approach to strategy development in a South African context requires wider experience from which to benefit. The involvement of national and local stakeholders has played a major part in ensuring that PRASA integrates its internal priorities with those of key public bodies.

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