

CHAIR  
CABINET ECONOMIC DEVELOPMENT COMMITTEE

## INFRASTRUCTURE STOCKTAKE REPORTBACK

### Purpose

1. This paper reports on the outcome of the Infrastructure Stocktake work programme and provides options for Government action.

### Executive summary

#### Introduction

2. Infrastructure has the potential to make a significant contribution to achieving New Zealand's sustainable development objectives. Investors across the economy need confidence in arrangements for the provision and regulation of infrastructure if they are to commit funds to new projects.
3. Infrastructure was identified as a significant business concern at the Growth and Innovation Advisory Board's Business-Government Leaders Forum in October 2002.
4. In February 2003, Cabinet agreed to establish a group of Ministers to consider and develop the Government's policy and response in relation to infrastructure issues. Infrastructure Ministers agreed to a definition of infrastructure that covers energy, transport, water and telecommunications.

#### Stocktake findings

5. To assist with this work, PricewaterhouseCoopers (PwC) was engaged to prepare an assessment of the quality of New Zealand's infrastructure. *The report has highlighted a number of national and local infrastructure concerns. These are subject to existing government work programmes. No previously unrecognised issues that might pose a serious barrier to growth and sustainable development have been identified.*
6. Existing local and national infrastructure concerns include:
  - Electricity security of supply (both short and long term), the former arising due to failure of the market to provide for security margins, while long term security issues are created by uncertainty around fuel availability and regulatory issues such as the future of the carbon tax regime and consent processes under the Resource Management Act;
  - Lack of investment in electricity transmission due to uncertainties about who should pay for investment and under what pricing methodology, coupled with land access issues;
  - Road congestion in some areas, especially Auckland, as a result of a failure of governance and funding arrangements to ensure appropriate levels of investment and demand management;
  - Water allocation issues, due to deficiencies in the statutory framework for prioritising water allocation between competing users; and

- Poor drinking water quality in some areas due, in part, to lack of funds to treat existing water supplies, and lack of appropriate expertise to manage water supplies.
7. In each case, either action has been taken to address the problem (e.g. establishing the Electricity Commission) or appropriate work programmes have been developed (e.g. the Sustainable Development Programme of Action work programmes on water and energy).
  8. In particular, the Minister for the Environment, the Associate Minister for the Environment and the Minister of Energy are leading work programmes to address key matters:
    - The Associate Minister for the Environment is proposing a work programme on RMA issues (to be considered by Cabinet Policy Committee on 5 May 2004) to provide a package of improvements for delivery to Cabinet Policy Committee by 28 July 2004. The RMA work will cover some work on mechanisms for accessing and allocating water.
    - The Minister for the Environment is taking the lead in ensuring that overall water allocation issues are progressed.
    - The Government has already taken a number of important actions, principally involving the Electricity Commission, to address key concerns around future electricity security of supply.
  9. There are no immediate concerns with telecommunications infrastructure, but officials note that factors such as low uptake of broadband and lack of adequate infrastructure for some users have the potential to impede realisation of the productivity gains that use of information and communications technology can generate.
  10. Several potential future “soft spots” were identified by PwC and officials, including security of gas supply, pressures on transport networks associated with the “wall of wood” and coal, irrigation and stormwater discharge issues, and access to and uptake of broadband.
  11. This paper proposes arrangements to help ensure that these and other future emerging issues can be identified and addressed in a timely manner.
  12. The Minister of Energy is reviewing policy settings in relation to gas exploration and development that would strengthen incentives for increased levels of gas exploration in the near term.
  13. Officials have identified five “principal infrastructure functions” where good performance is necessary if infrastructure policy and delivery agencies are to make their best contributions to sustainable infrastructure arrangements. The five functions are:
    - Promoting government outcomes
    - Establishing infrastructure policy settings
    - Monitoring
    - Futures analysis
    - Emergency management liaison.
  14. Several recent policy initiatives have yet to be completed or are, as yet, untested. Some uncertainty will remain until these are “bedded down”.

## Recommendations

15. The Stocktake has drawn attention to some significant infrastructure information gaps. Insufficient information is collected to identify possible pressure points or bottlenecks, and little or no international benchmarking is undertaken.
16. Several recommendations are made to improve information availability, including a work programme on infrastructure statistics, the introduction of periodic audits, and a future review of asset management planning requirements.

## Background

### Infrastructure Stocktake establishment and work programme

17. In February 2003, Cabinet agreed to establish a group of Ministers to consider and develop the Government's policy and response in relation to infrastructure issues [CAB Min (03) 5/14]. A progress report was presented to the Cabinet Business Committee in July 2003. Infrastructure Ministers agreed to a definition of economic infrastructure that includes energy, transport, water and telecommunications [CBC Min (03) 6/1].
18. The Minister for Economic Development announced the Infrastructure Stocktake work programme on 8 July 2003.
19. The Infrastructure Stocktake has been progressed by the Interdepartmental Working Group on Infrastructure (IWG). The IWG consists of officials from the Ministry of Economic Development, Department of Internal Affairs, The Treasury, Ministry of Transport, Ministry for the Environment, Department of the Prime Minister and Cabinet, Ministry of Agriculture and Forestry, Ministry of Tourism and Local Government New Zealand.
20. The Stocktake work programme included five work streams:
  - Infrastructure audit to assess the quality of current and future infrastructure and identify possible pressure points (PricewaterhouseCoopers);
  - Clarifying the relationships between infrastructure and sustainable development (Maarama Consulting);
  - Clarifying the linkages between infrastructure and economic growth (Pinnacle Research);
  - Developing a "best practice" infrastructure policy framework against which existing policy settings can be assessed (NZIER); and
  - Identifying current policy settings for infrastructure (IWG).
21. Summaries of the first four work stream reports are provided in Attachment 1.
22. Infrastructure was identified as a significant business concern at the Growth and Innovation Advisory Board's<sup>1</sup> (GIAB's) Business-Government Leaders Forum in October 2002. The Board then commissioned a report (Infometrics, 2003) to assess how business growth was being affected by infrastructure. Given the nature of the issues highlighted, and officials' work programmes, GIAB turned its focus to future

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<sup>1</sup> GIAB was established by the Government in May 2002 to provide it with an independent perspective on how to advance its growth and innovation programme. The members were selected for their expertise across business, research and labour.

preparedness, and hosted an Infrastructure Future Insight Forum in November 2003. The results of this work have been taken into account in preparing this paper.

### **Assets included in the Infrastructure Stocktake**

23. Infrastructure has the following characteristics:
  - Capacity can only be adjusted in large, “lumpy” increments;
  - High initial fixed costs and low marginal costs of supply;
  - High sunk costs and risk of asset stranding as conditions (such as tastes and technology) change;
  - Multiple users of the services, spanning production and final consumption;
  - Externalities not reflected in service charges (and which may have attracted regulation);
  - Scale and regulatory hurdles create long lead times for installing new capacity.
24. These characteristics clarified what assets to include in the Stocktake, namely:
  - In energy, all categories of gas assets, and all categories for electricity except retailing. Oil distribution assets are excluded;
  - In transport, airport runways and terminals, dock facilities, roads, rail tracks and inter-modal interchange facilities. Excludes vehicle and vessel fleets;
  - All categories of assets for reticulated water supply and wastewater treatment: water capture, treatment (including wastewater treatment), bulk distribution, local reticulation and irrigation;
  - In telecommunications, wireless and cellular transmission towers, transmission lines, local loops and international connections.
25. A substantial amount of capital is invested in infrastructure in New Zealand. As at June 2003, the Crown owned:<sup>2</sup>
  - Transpower’s electricity transmission network, valued at \$2,178 million;
  - Electricity generating state-owned enterprises with assets of \$6,738 million<sup>3</sup>; and
  - The state highway network, valued at \$12,556 million.
26. Drinking water and sewerage assets owned by local government were valued at \$3,000 million plus.
27. There are also substantial assets held by the private sector – Telecom is New Zealand’s largest firm with an asset base of around \$7,800 million.
28. The magnitude of capital invested in infrastructure sectors places great importance on the efficient and effective management of these assets, including re-investment and maintenance practices.

### **Why is infrastructure important?**

29. Infrastructure is important for the services it provides. Infrastructure provides services that support economic growth by increasing the productivity of labour and capital thereby reducing the costs of production and raising profitability, production, income and employment. The focus of the Stocktake is therefore wider than the “hardware” or physical assets associated with infrastructure. Accordingly, this paper includes comments on broad infrastructure policy issues.

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<sup>2</sup> “Financial Statements of the Government of New Zealand for the year ended 30 June 2003,” Treasury.

<sup>3</sup> Crown Company Monitoring Advisory Unit, see <http://www.ccm.au.govt.nz>

30. Infrastructure investment and consumption of infrastructure services have significant implications for achievement of sustainable development objectives, as infrastructure services:
- Encourage new investment across the economy;
  - Underpin many aspects of economic and social activity;
  - Facilitate the flow of ideas, goods and services;
  - Facilitate regional economic growth;<sup>4</sup>
  - Are critical to maintain an inclusive, healthy and productive workforce;
  - Involve large scale investment with significant environmental impacts; and
  - Generate a range of externalities in their production and consumption.
31. Infrastructure investment can increase productivity by:
- Promoting efficient resource allocation through easier access for labour and materials to particular localities, and allowing alternative activities, employment opportunities and investment to emerge; and
  - Providing the necessary economies of scale for urban agglomeration.

## Key current issues for New Zealand infrastructure

32. New Zealand is a long narrow country with a relatively small and dispersed population. Cost effective and secure infrastructure provision is particularly challenging in New Zealand.
33. The PricewaterhouseCoopers (PwC) audit provides a "snapshot" of the state of current and future infrastructure.<sup>5</sup> *The audit has highlighted a number of national and local infrastructure concerns. Each of these is subject to existing government work programmes.<sup>6</sup> No previously unrecognised issues that might pose a serious barrier to growth and sustainable development have been identified.*
34. The main concerns identified are discussed below in terms of the nature of the problem, work programmes to "fix" the problem and residual issues that the Government may need to address.

## Electricity

35. PwC identified the need for investment in generation and the transmission grid as the key issues for the electricity sector. Insufficient generation investment manifests as a lack of electricity supply security, which consists of two related parts: (1) dry-period security; and (2) medium and long-term security.

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<sup>4</sup> Growth of a region facilitated by infrastructure investment can be at the expense of growth in other regions.

<sup>5</sup> The PwC report contains a disclaimer that includes the following: "In preparing this report ... we have relied upon, and assumed the accuracy and completeness of all information available to us from public sources, and furnished to us by the companies and organisation we have consulted. We have evaluated that information through analysis, inquiry and review but have not sought to verify the accuracy or completeness of any such information or conducted an appraisal of any assets." Officials have reviewed the PwC report, and have relied extensively on the PwC report in preparing this paper, but are not in a position to verify all of the material the report contains.

<sup>6</sup> Attachment 2 provides an overview of the extensive range of current and recent work programmes dealing with infrastructure issues.

### ***Dry-period security: description***

36. Spot market electricity prices can become highly volatile in dry periods. Unpredictable price increases that cannot be adequately managed impact negatively on industrial production.
37. Several weaknesses in the electricity market have contributed to this problem, including insufficient reserve generation, and under-developed demand-side management and “hedge” markets.
38. The Government has taken several steps to address dry-period security needs. The new Electricity Commission is charged with helping ensure security of supply in dry periods, e.g. by contracting for reserve energy, requiring disclosure of information by generators on fuel supplies and plant availability, improving the transparency and liquidity of the electricity hedge market, promoting energy efficiency and promoting demand-side participation in the market.<sup>7</sup>

### ***Medium and long-term security: description***

39. The Ministry of Economic Development’s *Energy Outlook* and other reports, show that significant new generation is required to address longer-term supply concerns. Meridian Energy’s withdrawal from Project Aqua sharpens the focus on this matter.
40. Potential barriers to new generation investment identified by PwC and officials, include:
  - Regulatory uncertainty due to:
    - the possibility that the newly established Electricity Commission might seek to introduce arrangements that are unattractive to investors;
    - the timing and level of a carbon tax;
  - Planning and consent issues associated with the Resource Management Act 1991 and land access issues associated with the Conservation Act 1987;
  - The earlier than anticipated depletion of the Maui gas field and the cost of alternatives (e.g. coal and/or imported liquefied natural gas (LNG));
  - Ownership by state-owned enterprises (SOEs), which gives rise to a perceived risk that entrants may be disadvantaged by inequitable competitive conditions;
  - Transmission capacity concerns (discussed below).
41. Actions under way to address medium and long-term supply security include the establishment of the Electricity Commission and proposals to encourage distributed generation and demand-side management. Electricity prices are expected to rise as more costly fuels are used and this will increase the competitiveness of renewables and demand management options.
42. The renegotiation of the Maui contracts to encourage full extraction of existing gas reserves, promotion of access to the Maui pipeline, promotion of sound gas governance and other steps to encourage exploration are intended to improve gas and electricity supply security.
43. The Energy Efficiency Conservation Authority has an ongoing role to encourage, promote and support the uptake of energy efficient initiatives and renewable energy under the National Energy Efficiency and Conservation Strategy.

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<sup>7</sup> These and other requirements on the Electricity Commission are set out in the Electricity Act and amendments to the Act contained in the Electricity and Gas Industries Amendment Bill, as well as in the draft Government Policy Statement (GPS), soon to be finalised.

## ***Electricity transmission***

44. PwC has noted that the electricity transmission grid requires investment to increase capacity to meet demand growth and replace aged assets. Grid constraints also need to be relieved. Barriers to this investment, include:
- Uncertainty as to who should pay for investments and under what pricing methodology. The Electricity Commission will address these issues.
  - Access to land, particularly for line upgrades. Transpower argues that the upgrade provisions in the Electricity Act 1992, which were amended in 2001, remain unduly restrictive. The Government has advised Transpower to test the new provisions in court before it will consider further amendments to legislation.

## ***Electricity: what remains to be done?***

45. The Electricity Commission has only recently been established, and needs to progress the issues in the forthcoming Government Policy Statement (GPS) and gain the confidence of the industry. MED will monitor the Commission's performance.
46. Sound governance in the gas industry will help promote electricity security. A proposal for a co-regulatory gas governance model is currently under consideration by Government. If this initiative fails to result in sound governance, it may be necessary to expand the role of the Electricity Commission to include gas. Legislation providing for this is currently before Select Committee.
47. Regulatory issues such as the future carbon tax regime should ideally be addressed soon to provide greater certainty for infrastructure providers and users, not least to promote a clearer path for investor decisions in generation using coal and LNG. This is not straight forward, given the current uncertainties internationally on the nature and timing of countries' responses to the Kyoto Protocol, and on commitments beyond 2012 which are yet to be negotiated. Issues relating to the Resource Management Act also need attention (Resource Management Act matters are discussed further below).

## **Transport**

48. The primary transport concern identified by PwC is road congestion in Auckland, which has the potential to limit productivity in Auckland and negatively impact on the environment, health and social-connectedness.<sup>8</sup> PwC also identified other areas as having "emerging" congestion issues, although these do not present serious growth or sustainability impediments at this stage.
49. Officials have identified the most important factors giving rise to Auckland's congestion problem as:
- Road funding and pricing arrangements have not reconciled increasing demand for road use with new construction;
  - Uncoordinated and uncertain regional governance, policy and consents processes; and
  - Insufficient development of demand management techniques and passenger transport options.

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<sup>8</sup> The New Zealand Chamber of Commerce estimates that in order for New Zealand to achieve 4 per cent growth over the next decade, Auckland's output needs to increase by approximately 80 per cent.

50. A number of inter-related steps are underway to address Auckland congestion, including:
- The proposed establishment of the Auckland Regional Transport Authority to co-ordinate the region's transport network;
  - The Government's announcements in December 2003 that \$1.6 billion would be spent on Auckland transport over a 10-year period (in addition to the forecast National Land Transport Programme expenditure);
  - A combination of demand management programmes, further expansion of the public transport network and accelerated road construction;
  - Councils are to be directed by law to prepare integrated changes to planning documents; and
  - Consideration of road pricing options.
51. There are also concerns about deferred maintenance on parts of the rail network (including low levels of asset replacement over the last 8 years). This concern has been rising due to the increasing quantity of freight being carried via rail, and the fact that several growth opportunities for rail have been identified (relating to the coal, forestry and dairy sectors as well as container traffic). These trends indicate the need for further investment in the rail network.

***Transport: what remains to be done?***

52. New governance, planning and funding arrangements need to be implemented in Auckland. Road pricing and other demand management options warrant active consideration (not just for Auckland) – consideration should also be given to whether these and other lessons from the Auckland experience might have wider application.
53. The implementation of new governance and pricing arrangements for rail under Government ownership will need to be monitored by the Ministry of Transport.

**Water allocation and quality**

54. Two primary issues associated with water infrastructure in New Zealand have been identified by officials and PwC:
- Water allocation; and
  - Drinking water quality.

***Water allocation***

55. PwC notes that "current approaches to water allocation need to be improved". Some regional councils have not completed plans for water allocation and there is a limited range of tools available for addressing allocation of water between competing users (e.g. irrigation, energy, other industrial users, recreational users, domestic users and environmental sustainability). The resultant uncertainty is a disincentive to invest, and there is currently no framework for reconciling sustainable development objectives.
56. The SDPoA freshwater work programme, jointly led by the Ministry of Agriculture and Forestry (MAF) and the Ministry for the Environment (MfE), has three main work streams:
- water allocation and use;
  - water quality – managing land use; and
  - water-bodies of national importance.

The SDPoA workstream on water allocation and use work stream is considering council water allocation planning roles and allocation tools.

57. Supplementary work streams are engaged to determine the national interest, optimise outcomes and develop new tools. The water work programme is scheduled over a two-year period, with any changes to water management resulting from the programme being made, at the earliest, in 2005.
58. Issues associated with water allocation between competing water uses in the Waitaki catchment led the Government to introduce the Resource Management (Waitaki Catchment) Amendment Bill, which enables the creation of an over-arching framework for water allocation decisions in the catchment and allows the merits of all of the competing water uses to be considered. The Bill, as reported back to Parliament from the Local Government and Environmental Select Committee, proposes establishing an independent statutory board to develop and approve a water allocation framework, and appointing a panel of commissioners to decide on resource consent applications for water use in the catchment against the new allocation framework.
59. The Bill only applies to the Waitaki catchment. The Government introduced the Bill because the water allocation concerns in the Waitaki catchment were considered urgent and unable to await the outcomes of the SDPoA before resolution.
60. Ministers are considering the sequencing of work on water allocation through decisions made on the Waitaki legislation, a forthcoming review of the RMA (see below), and the SDPoA. The Minister for the Environment is taking the lead in ensuring that overall water allocation issues are progressed.

### ***Drinking water quality***

61. Ministry of Health data dated July 2003 shows that 9 per cent of the population receive drinking water that is unsatisfactory in terms of quality and/or risk management and would fail to meet the Ministry of Health's Drinking Water Standards (2000).
62. The proposed drinking water standards will require all drinking water suppliers to take all practicable steps to meet the drinking water standards. As a result, some territorial authorities and other suppliers will need to upgrade their systems. This is an issue for many of the smaller councils and a small number of metropolitan suppliers, where surface water sources are subject to minimal treatment.
63. MfE is currently developing a national environmental standard on human drinking water sources. This will complement the proposed Bill to provide better management of human drinking water from "source to tap". The national environmental standard is expected to involve monitoring, grading and reporting of suitability of human drinking water sources, and an assessment of risk of contamination in the catchment.

### ***Water allocation and quality: what remains to be done?***

64. Recommendations arising from the SDPoA water work relating to water allocation and use, water quality and water-bodies of national importance will need to be addressed.
65. Some territorial authorities believe they will struggle to finance the upgrades required to meet the new drinking water standards. The Ministry of Health is developing policy papers for Cabinet on the most effective options for assisting drinking water suppliers in upgrading facilities. A range of options for assistance will be outlined, and a request for \$100 - \$200 million over the next 10 years from the Crown may be made.<sup>9</sup> The Ministers of Health and Local Government intend to shortly announce details of a work programme on whether the Government should assist drinking water suppliers.
66. Some small communities servicing large tourism activities have a problem financing appropriate drinking water treatment and sewerage infrastructure. A subsidy scheme is to be introduced in the 2004/05 Budget, and other forms of assistance such as capacity building will be addressed.

### **Upcoming challenges**

67. In addition to the "snapshot" of the current state of New Zealand's infrastructure stock, the PwC report also considered whether or not existing infrastructure arrangements are sufficiently resilient to meet NZ's sustainable development objectives in the future.
68. Several potential future "soft spots" were identified. Officials have also identified a number of areas that could have a negative impact on sustainable development.
69. This paper proposes arrangements to help ensure that these and other future emerging issues can be identified and addressed in a timely manner.
70. The "soft spots" identified are covered in the next section.

## **Energy**

### ***Gas security***

- Gas exploration and field development may be insufficient and may have negative impacts on electricity generation and other gas-using investment. Unless more gas is found, greater use of other electricity generation fuels such as coal may be required. Upward pressure on electricity and gas prices is expected.

The Minister of Energy is reviewing policy settings in relation to gas exploration and development that would strengthen incentives for increased levels of gas exploration in the near term.

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<sup>9</sup> In addition, the Ministry of Health and the Department of Internal Affairs are working on an assistance package which will strengthen the capabilities of inadequately resourced drinking water suppliers to provide water that is safe to drink. Collaborative programmes between central, regional, local governments, drinking water suppliers, Local Government New Zealand, the New Zealand Water and Wastes Association and other relevant non-government organisations are envisaged.

## **Transport**

### ***Wall of Wood***

- PwC notes that the maturation, harvesting and transportation of the projected “wall of wood” will put pressure on existing road and rail transport networks and ports. In many cases, the rail infrastructure is inadequate. Use of roads to transport the “wall of wood” can be expected to significantly impact on ongoing road maintenance requirements.

### ***Coal***

- Solid Energy plans to double the amount of coal taken out of the West Coast. PwC reports that rail upgrades and maintenance is required to support existing volumes, and that a number of grades need to be eased to allow an increase in rail tonnages.

### ***Auckland International Airport***

- PwC reports that passenger processing capacity at Auckland International Airport (AIAL) is under pressure. The capacity of passenger processing areas is at times insufficient to accommodate the volume of passengers that currently pass through the airport, and is likely to be further stretched as passenger numbers increase. AIAL is planning major extensions in the next couple of years and work is being done to identify how much space will be required by border agencies.

## **Water**

### ***Irrigation***

- In some cases, the large scale of irrigation projects and uncertainties over access to water mean that financial institutions are unwilling to fund scheme development. Concerns have also arisen over the environmental impacts of irrigated farming (this issue is being addressed under the "water quality - managing land use" work in the SDPoA). The Minister of Agriculture has asked MAF to examine whether there is a role for greater central government assistance in funding community irrigation infrastructure.

### ***Sewage and stormwater discharges***

- PwC has noted that there are semi-regular occurrences of stormwater and sewage overflows in cities and towns, particularly during heavy rain, which can cause human health issues and environmental degradation. Due to lack of adequate benchmarking the extent of overflow discharges and their impact is at present relatively unknown.<sup>10</sup>

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<sup>10</sup> If intervention is warranted, the cost of funding infrastructure improvements to resolve the problems may cause increases in rates. The recent report "Funding Auckland Regional Stormwater" prepared by Infrastructure Auckland, PwC, and the territorial authorities in the Auckland region, notes that up to six times the current level of funding dedicated to stormwater management may be needed to meet the issues associated with the region's stormwater.

## Telecommunications

### ICT

- Officials note that ICT has an important role to play in improving New Zealand's productivity. Barriers to realising productivity gains include prices of some telecommunications services, low uptake of broadband, lack of adequate infrastructure for some users (e.g. lack of an Advanced Network), and low user capability.

### International Broadband

- Officials note that ICT connectivity is critical for New Zealand to engage in data-rich activities in a global setting, particularly universities and other research institutions that collaborate with overseas institutions. The Ministry of Research, Science and Technology is currently developing a business case for an Advanced Network which will facilitate such international collaboration. At present, sufficient international bandwidth is available for this and other foreseeable purposes, but price is an issue for some users. MED monitors prices on an ongoing basis and reports results and recommendations to the Minister of Communications.

## Resource Management Act

71. The PwC report noted that "there is a general consensus across industry that the Resource Management Act is conceptually good legislation" but that it requires a "time consuming and expensive process due to the level of consultation required". Similarly, the 2003 GIAB report, *Generating Growth: Infrastructure*, found that, of a sample of 50 major businesses and business organisations, 18 per cent identified the Resource Management Act as one of the main constraints on their growth.
72. Other problems noted in the PwC report were:
  - processes are focused at local or regional needs and do not contain incentives to balance local and national benefits and costs;
  - with little guidance on how to allocate resources, the default approach of "first come – first served" applies which may not result in the most beneficial resource use;
  - the inconsistency of decision making around the country is said to affect the competitiveness of infrastructure providers and their ability to respond to changing demands; and
  - the process can be undermined by small interest groups who hold out and force large costs on others.
73. These problems constrain the ability for rapid responses to infrastructural needs, although PwC notes that the constraints are not generally seen as insurmountable.
74. Given the breadth of Government responsibility, not all legislation can or should contribute exclusively to economic objectives. The RMA is focused on sustainable management and avoiding or mitigating adverse environmental effects, taking into account social and cultural concerns.<sup>11</sup> Legislation such as the RMA plays an important role in balancing environmental or community and industry needs.

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<sup>11</sup> The Local Government Act 2002, along with the Land Transport Management Act 2003 (LTMA), also requires a sustainable development approach. The LTMA will increase the complexity of decision-making related to land transport infrastructure. The Act has increased consultation requirements and broadened the land transport decision-making framework to include social and

75. The extensive community-based approaches inherent in the RMA may be costly in terms of time and money. A better balance needs to be found between securing infrastructure providers' and users' confidence, and sustainability.
76. The Associate Minister for the Environment has proposed a work programme to provide a package of improvements for delivery to Cabinet Policy Committee by 28 July 2004. Work on the issues described above has been underway for some time, and will be taken forward in this review. The objective of the review will be to improve the quality of decisions and processes, without compromising good environmental outcomes or sacrificing public participation. At its meeting on 5 May 2004, POL endorsed the proposed work programme and the review objective.
77. The following broad categories are to be considered as part of the review:
- achieving the right balance of national and local interests;
  - improved design and process of local policy formulation;
  - improved consent decision-making process;
  - allocation of natural resources (including water); and
  - support measures for building capacity and promoting best practice and implementation.

## **Government's role in infrastructure**

78. Infrastructure faces major challenges. How well equipped are we to identify and respond to emerging needs?
79. An understanding of government's role is important to assist decisions on the policy issues in the discussions that follow. This section provides an overview of government's role in infrastructure. Attachment 3 contains further details on government's role and also summarises critical issues for good quality infrastructure policy and planning.
80. At the highest level, the Government's infrastructure role is to ensure that infrastructure makes its full contribution to sustainable development and growth. Central and local government, and the private sector own all infrastructure. Hence, the Government must give attention to over-arching regulatory policy issues that impact directly and indirectly on infrastructure (e.g. resource planning legislation) as well as to sector-specific regulation.<sup>12 13</sup>

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environmental criteria along with efficiency and effectiveness. Other legislation focuses on safety, health or other outcomes.

<sup>12</sup> Issues relating to market responsiveness will need government attention from time to time. For example, in electricity, a dry-period security margin is justified where commercial arrangements have been found not to provide infrastructure services to a level that is optimal from a societal point of view. Decisions on issues like this may need to be accompanied by decisions on funding, and in some circumstances, by decisions on ownership and governance as well.

<sup>13</sup> Some of government's general programmes to support economic development also impact on infrastructure. For example the Foundation for Research Science and Technology (FRST) has restructured its investment portfolios to reflect GIF and SDPoA principles and is now developing a new investment strategy for R&D on infrastructure to take account of Government and industry priorities. See Attachment 2.

81. In essence, government's role in infrastructure provision is to ensure that policy and institutional arrangements promote infrastructure providers' and users' confidence. This means adopting policies to:
- Monitor infrastructure issues actively;
  - Facilitate a smooth response to new infrastructure pressures as they emerge;
  - Reduce the incidence and severity of unexpected service failures; and
  - Assist transitions such as those arising from technological changes and shocks (including disasters).

Price rises can be expected as these adjustments take place, and the government has a role to ensure that rises are reasonable.

82. Infrastructure investment needs to be timely – early enough to avoid bottlenecks and promote confidence, but not so early that financial and other resources are committed too far in advance of need and asset stranding risks arise. Government may need to take the lead in promoting investment where bottlenecks are likely to be particularly costly in eroding confidence.

### **Infrastructure policy objective and framework**

83. Drawing on the NZIER report, officials propose the following over-arching objective for infrastructure policy:

*“To enhance infrastructure’s net contribution to economic growth and societal well-being over time, while reducing the incidence and severity of service failures and adverse effects on the environment.”*

The Foundation for Research Science and Technology (FRST) has indicated that, should the Government agree to this objective, FRST will adopt the objective to guide its new infrastructure research and development (R&D) investment strategy.

84. This objective is consistent with the Government’s objectives with respect to the SDPoA and the Growth and Innovation Framework (GIF), as well as with sector-specific strategies such as the New Zealand Transport Strategy.
85. The objective provides the focus for an infrastructure policy framework designed to answer the questions: Will New Zealand’s infrastructure be sufficient to support the Growth and Innovation Framework objectives to return our per capita income to the top half of the OECD? What can be done to ensure that infrastructure makes its full contribution to growth and sustainability objectives in the coming years? Arrangements that bring infrastructure pressures to attention before they turn into serious impediments, are required.
86. Officials identified five “principal infrastructure functions” where good performance is necessary if the policy and delivery agencies involved are to make their best contributions to sustainable infrastructure arrangements. The five functions are:
- *Promoting government outcomes* – i.e. ensuring that GIF and sustainable development principles are appropriately taken into account in establishing the strategic overview for infrastructure policy.
  - *Establishing infrastructure policy settings* - Advice to the government on policy issues, including:
    - Identification and co-ordination of policy proposals across the various agencies involved;

- Fostering improvements to the governance and regulation of infrastructure markets. This includes ensuring adequate rules of engagement for infrastructure users and suppliers, and promoting security of supply;
  - Provision of advice on wider policy issues, e.g. relating to the RMA and the Kyoto Protocol;
  - Setting up arrangements for monitoring the Crown Entities involved in infrastructure delivery; and
  - Advice on financing arrangements for publicly and privately funded infrastructure investment.
- *Monitoring* – Assembly, analysis, monitoring and sharing of data/information on infrastructure quality, availability and needs, including:
    - *Statistical monitoring*;
    - *Audits such as the PwC audit* completed for the Infrastructure Stocktake;
    - *Asset management planning*: To develop cost-effective long-term strategies for infrastructure supply;
    - *Ad hoc monitoring*: To act as an “antennae” on emerging problems and needs within infrastructure sectors; and
    - *Benchmarking*: To answer the question “how well is our infrastructure delivering in comparison with our competitors and the OECD?”
  - *Futures analysis* – Provision of comprehensive “futures analyses” on infrastructure needs including activities such as:
    - Forecasting demand and other variables where appropriate analytical techniques are available (e.g. GDP) or where future developments are largely pre-ordained (e.g. population cohorts);
    - Ensuring that forecasts are robust to a range of yet-unknown possible developments (e.g. decarbonisation, dematerialisation, new technologies); and
    - Building in a state of preparedness for dealing with shocks (e.g. SARS).
  - *Emergency management liaison* – Liaison with disaster contingency planning and emergency management initiatives elsewhere within government.

87. A “best practice framework” for infrastructure policy (set out in Attachment 4) was also developed to identify the principles for sound policy arrangements. The framework features several “tests” to facilitate assessment of the effectiveness and robustness of current policy settings in the four sectors. While policy arrangements will vary between sectors, there are many principles in common. Poorly developed policy can result in an over-reliance on supply rather than demand management, failure to align sector performance with government objectives, inefficient pricing and deterrence of timely investment in new capacity.

## **How sound are current policy and functional arrangements?**

88. Officials have undertaken a preliminary comparison of functional arrangements and policy settings in the four sectors, against the policy functions and the “best practice” policy framework. The intent was to enable tentative conclusions to be drawn on whether policy settings in the four infrastructure sectors are well aligned with sustainable development, and whether any improvements to functional arrangements might be suggested. The results of this assessment are discussed below.

## **Promoting government outcomes**

89. Are policy settings and functional arrangements likely to deliver the key (central and local) government objectives within the GIF and the SDPoA?
90. Infrastructure considerations are explicit features of three of the SDPoA work programmes: sustainable cities (seeking “improved provision of infrastructure and services”), energy, and water allocation use and quality. Infrastructure is also one of the “themes” under GIF.
91. Officials considered how well the policy settings of each of the infrastructure sectors are aligned with the Government’s sustainable development objectives. Officials concluded that, while there are a variety of institutional arrangements, sustainable development objectives are generally a common theme in the policy settings of the four infrastructure sectors. Sustainable development principles are comprehensively included in transport policy and improvements in incorporation of sustainable development within energy and water are underway as a result of initiatives in the SDPoA. Some sustainable development objectives also feature in telecommunications policy (e.g. the telecommunications service obligation) and further improvements will be included in the proposed Digital Strategy. Attachment 5 sets out details.

## **Establishing policy settings**

92. The assessment of policy settings and functional arrangements suggests that there are some weaknesses in present policy settings, but has not uncovered significant, previously unrecognised gaps.

## **Information and monitoring**

93. To “use the best information available to support decision making” is one of the ten principles of the SDPoA. This implies that decision-makers should have access to high quality information that allows them to monitor existing and future conditions or issues and to make informed decisions.
94. Hence, it may be necessary to provide sufficient information for government monitoring to:
  - Establish drivers of demand for infrastructure services, monitor trends in these drivers and form expectations about future movements (“futures analysis”);
  - Identify possible “bottlenecks” or pressure points;
  - “Benchmark” New Zealand’s infrastructure performance against international practices;
  - Ensure the security and reliability of infrastructure capital stock to meet current and anticipated demand – including resource supply, capacity, condition, uptake of infrastructure alternatives and efficiency;
  - Monitor the appropriateness of provision of goods currently deemed as “public” in the face of changing conditions, especially technological change;
  - Ascertain that infrastructure is making a positive contribution to (and minimising adverse impacts on) sustainable development;
  - Monitor the performance of Government policy and public agencies, e.g. to assess whether policy intervention might achieve improvement;
  - Establish the community’s redundancy requirements (e.g. dry-period security of supply).
95. Clearly, a wide range of quantitative and qualitative information is required to assist in making informed decisions.

96. The policy and functional assessment has drawn attention to some weaknesses in infrastructure monitoring arrangements. Significant infrastructure information gaps have been identified:
- Insufficient information collected or, in some sectors inadequate information disclosure requirements, has impacted on monitoring to identify possible pressure points or bottlenecks;
  - Little or no benchmarking against best practice or international standards is undertaken. Benchmarking does not focus on the absolute level of performance, but is rather a measure of how New Zealand's relative performance affects our competitiveness and growth prospects internationally;
  - With respect to sustainable development, there is no systematic monitoring of the progress towards decoupling of economic growth from pressures on the social, cultural or physical environment.
97. Monitoring and analysis (as opposed to statistical design and data collection) are considered a core responsibility of the relevant policy agencies. The next section contains a number of recommendations to improve infrastructure data collection and monitoring.

### **Futures analysis**

98. The policy and functional assessment has also drawn attention to weaknesses in futures analysis relating to infrastructure provision. Robust futures analysis would encompass:
- assessing the significance of alternative "mega-trends" (e.g. relating to possible geo-political events and the like) and the impact of new technology;
  - taking account of forecasts of relevant variables which are amenable to analysis (e.g. GDP, population cohorts);
  - ensuring a preparedness for dealing with shocks (e.g. SARS).
99. Public and private sector participants undertake considerable work in energy (e.g. MED's *Energy Outlook*), and futures work is included in the SDPoA programme on energy. Transit New Zealand has prepared 10 year plans for state highways and the Local Government Act 2002 requires local authorities to take at least a 10-year outlook in developing their Long Term Council Community Plans (LTCCPs), which will include, among other things, water and wastewater services and local roading.
100. However, there may be advantage in extending the present work so that it deals more comprehensively with these elements.<sup>14</sup> There may also be a need for further work to assess the size of gaps between performance and expectations (this might help draw attention to a need for improved demand management and more innovative supply-side options such as small-scale renewable energy), and perhaps for exploring the linkages between scenarios across the different sectors.
101. Like monitoring, futures analysis is a core responsibility of the relevant policy agencies. Recommendations below are (*inter alia*) intended to facilitate better futures analysis by these agencies.

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<sup>14</sup> As an example, the Ministry of Tourism notes that tourism demand affects all sectors but there are no formal linkages for the tourism forecasts and research it produces to be taken into account by other agencies responsible for long term infrastructure planning.

## **Emergency management**

102. Government also plays a major role in preparing for and co-ordinating responses to disasters (including acts of terrorism). Working with officials from other government departments, the Department of the Prime Minister and Cabinet (DPMC) has undertaken a preliminary investigation of critical infrastructure security. Details are set out in Attachment 6. DPMC will take account of the results of the Infrastructure Stocktake in its future work.

## **Policy options to improve infrastructure resilience**

103. There is a need to monitor infrastructure issues actively, and be prepared to act with supply and/or demand management policy responses as pressures are identified that cannot be adequately addressed by infrastructure providers and commercial participants under existing settings.

104. This section presents recommendations, drawing from the conclusions from the preceding comparison of policy settings and functional arrangements against the “best practice” policy framework and the five policy functions. The recommendations can be categorised as follows:

- Those designed to make present policy arrangements work better;
- A further group of specific recommendations broadly addressed to information needs is then presented;
- Ministers are also invited to consider whether these recommendations should be supplemented by improvements to institutional arrangements relating to cross-sectoral infrastructure advice.

The purpose of improved arrangements would be to ensure better outcomes and improve infrastructure providers’ and users’ confidence going forward.

## **Making policy arrangements work better**

105. The preceding analysis has drawn attention to a case for a range of infrastructure policy improvements. If Ministers agree, officials (MED lead) will take steps to ensure that agencies with infrastructure policy development roles are well informed of the key learnings from the Stocktake, for example, to ensure that the “best practice” policy framework is applied where relevant and that it is improved over time by drawing on experience with its use, and that opportunities to promote sustainability are fully recognised and taken into account in infrastructure policy. Officials will take steps to ensure that the messages are presented in a form that facilitates this transfer of knowledge.

## **Improving information availability**

106. Several possibilities have been considered to help improve the availability of information, including:

- Enhanced information about infrastructure stocks and service provision;
- Periodic infrastructure audits of the type recently conducted by PwC;
- Extended and improved asset management plans to ensure effective service delivery;
- Fostering discussions to improve dialogue between infrastructure providers and users.

### **Enhanced infrastructure statistics**

107. There are a number of work programmes currently under way with respect to statistical design and data collection. For example, Statistics New Zealand's sustainable development indicator work programme will probably include high level infrastructure indicators along with the development of decoupling indicators, although it is unlikely that these will be adequate to meet sector-specific infrastructure policy requirements.
108. Given that some infrastructure is managed at the local level, there will be a need for some regional or local data collection and monitoring, along with some at the national level.
109. Various other programmes, such as GIF, Environmental Performance Indicators (Ministry for the Environment), Social Performance Indicators (Ministry of Social Development), tourism data (Tourism Research Council) and Quality of Life indicators (local authorities), involve the collection and/or analysis of data and other information relevant to infrastructure. There is also a range of current initiatives to improve statistical information relevant to the state of infrastructure, its performance and the pressures on it. These include:
- the recently approved recommendations from the review of the official statistical system [Cab Min (04) 6/7] which should promote improved use of existing data relevant to infrastructure and other programmes to provide a more complete statistical picture of New Zealand's key infrastructure and its performance; and
  - a Statistics New Zealand work programme to prepare a comprehensive set of indicators on demand for and use of ICT by households, businesses and government to enable individuals, communities, businesses and the Government to understand how new ICT technologies are changing the economy and society.<sup>15</sup>
110. It is recommended that MED, working closely with Statistics New Zealand and other relevant agencies, should undertake further work to clarify information gaps and identify the information required to fill these gaps, including the possible development of infrastructure indicators, taking into account existing statistics and indicator programmes and using established best practices for identifying any such indicators. This group should provide guidance on how information requirements are to be met and by whom, along with any additional data collection and funding requirements, and report back to Infrastructure Ministers by December 2004.

### **Periodic audits**

111. The purpose of infrastructure audits is to provide an independent sector by sector assessment of the quality of the current infrastructure stock and potential future pressure points. This provides a foundation for which policy makers can work from and helps them to focus on and prioritise problem areas. The PwC audit conducted as part of the Infrastructure Stocktake is an example.

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<sup>15</sup> The programme, agreed in mid-2003, includes a re-design of the ICT supply-side survey to meet OECD standards, the design of new surveys of business, household and Government use of ICT, and design of a survey of services provided by internet service providers. This will permit the development of ICT satellite accounts, consistent and integrated with New Zealand's official national accounts. The first annual ICT publication will be released in 2005/06.

112. Infrastructure audits are substantial exercises (the recent PwC audit cost \$200,000). Future audits may improve over time as officials, auditors, infrastructure providers and users gain experience with the data gathering and peer review processes involved, and as comments are received on audits as they are released.

113. There are two basic ways to approach periodic auditing:

- Audit all infrastructure once every 3 years. A 3-year gap provides a balance between infrastructure sectors that are rapidly changing and where more frequent assessments may be justified (e.g. telecommunications)<sup>16</sup>, and those that are evolving more slowly and hence do not require very frequent assessments (e.g. water); or
- Tailor the frequency of audits to meet the needs of each infrastructure sector. Hence, for sectors where changes occur slowly (e.g. water and transport), audits could be carried out every 5 or more years, while in sectors such as telecommunications, the audits could be every 2-3 years. This approach may be more appropriate and cost-effective than auditing all sectors every 3 years. However, the different timing of audits would mean that cross-sector comparisons of the quality and requirements of infrastructure in each sector could not be easily undertaken.

114. Officials recommend that Cabinet agree in principle that future infrastructure audits be conducted every three years. Officials (MED lead) will advise on audit needs for the 2006/07 year, together with information on costs. Recommendations would be accompanied by funding requests.

### ***Asset management plans (AMPs)***

115. The goal of infrastructure asset management planning is to establish arrangements designed to meet a required level of service in the most cost-effective way through the creation, acquisition, maintenance, operation, rehabilitation, and disposal of assets to provide for present and future infrastructure users.

116. Sound asset management planning has a potentially powerful role in ensuring that providers, working with users, maintain service quality over time. This is particularly important given that much of New Zealand's infrastructure is provided by companies that are not subject to strong commercial pressures. A variety of regulatory AMP requirements exist covering infrastructure in public ownership and/or where the assets have strong monopoly characteristics.

117. The key elements of infrastructure asset management planning are:

- Providing a defined level of service and monitoring performance;
- Developing cost effective management strategies for the long term;
- Taking a life-cycle approach; and
- Managing risks associated with asset failures.

118. AMPs for water and transport came into widespread use in local government after the amendments to the Local Government Act (LGA) in 1996 requiring local authorities to prepare 10-year Long Term Financial Strategies (LTFS). The LGA 2002 requires assessment of water and sanitary services and this expands the role of councils to consider the quality of these services to not only the community served by council infrastructure, but also the community served by privately owned services (e.g.

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<sup>16</sup> Where infrastructure is owned or operated by the private sector, there is a need for the provision of relevant information on a voluntary basis.

schools, camping grounds).<sup>17</sup> AMPs are not explicitly referred to in local government legislation but form the basis of 10-year financial planning (now encompassed within a LTCCP rather than a LTFS).

119. Among the things local authorities are required to include in their LTCCPs is:
- How they will assess and manage the asset management implications for changes to (a) demand for consumption of services; and (b) service provision levels and standards;
  - What additional asset capacity is estimated to be required to respect of the above changes;
  - How the cost of additional capacity will be met; and
  - Asset maintenance, renewal, and replacement information including costs.
120. Although these provisions do not apply to council controlled organisations, the LGA places other reporting disciplines on councils to ensure that the contribution of such organisations to council outcomes is monitored.
121. Less comprehensive regulatory requirements exist for asset management planning in electricity distribution. Similar arrangements have been agreed for gas pipelines, but these have not yet been introduced.
122. The local authority requirements reflect the sustainability objectives of LGA, while the energy requirements reflect narrower competition policy concerns.
123. The LGA 2002 also requires the Local Government Commission to review the Act as soon as possible after the 2007 local authority elections. This review will include council planning procedures. It is proposed that the content and coverage of these arrangements be included in the Commission's wider review of the LGA 2002 to include asset planning by council-controlled organisations.

### ***Facilitated discussions***

124. GIAB has expressed interest in “facilitated discussions” between infrastructure users and providers, and possibly with Ministers. The purpose of the discussions would be to increase collaboration between government and business in identifying emerging infrastructure needs (particularly relating to export-oriented businesses) and to assist in the development of linkages between particular infrastructure sectors.
125. GIAB has commenced work on an “Export Infrastructure Services Project” to identify risks and opportunities associated with transporting goods from production sites to markets. The terms of reference cover identification of the nature and scope of future demand, preparedness of transport infrastructure providers to meet demand, and prospects for improving co-ordination. Tourism is explicitly excluded from the study. Discussions between users and providers are a key part of GIAB’s process. GIAB plans to report to Ministers in May/June 2004.
126. Further initiatives to promote dialogue around infrastructure issues include:

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<sup>17</sup> The public health risk management plans required under the proposed Health (Drinking Water) Amendment Bill will complement the water suppliers’ AMPs.

### *Building an infrastructure dimension into sector engagement*

- The sector engagement programme conducted by New Zealand Trade and Enterprise provides an opportunity to improve public and private sector co-ordination by facilitating the development of networks and linkages between government and the sectors. Recent sector engagements have led to an appreciation across government and firms that a government-facilitated process to address sector specific impediments to growth can be an effective economic development tool.

An infrastructure dimension could be built into existing sector engagement frameworks to facilitate increased dialogue on infrastructure issues. For example, specific proposals are under development to ease buildability constraints which might arise from construction activity following the Auckland Transport Package, by strengthening the relationship between government and industry.

Ministers are invited to note that MED plans to ensure that infrastructure issues are built into sector engagement programmes.

### *Regional Partnership Programmes (RPPs)*

- The regional partnerships programme facilitates partnership formation in 26 regions for the purposes of economic development. It gives regions guidance and funding to develop and activate sustainable economic growth strategies. The programme has three components: strategy development, capability building and major regional initiatives (MRIs) for economic development.

The purpose of the RPP is to encourage all partners within a region to take a more strategic view of their regional economic development goals and needs, in addition to making the most of their strengths and competitive advantages. This requires developing a shared vision of how the foundations for regional development, including key infrastructure services, can be improved.

Ministers are invited to note that MED plans to ensure that infrastructure issues are built into regional partnership programmes.

### *Collaborative action within local area water advisory groups*

- The Ministry of Health is considering a collaborative approach between a Medical Officer of Health, district councils, stakeholder groups and regional councils to address drinking water and sewage issues within a local area. These local water advisory groups are intended to make use of local expertise to advise on public health risk management plans and assist district councils develop their LTCCPs as they relate to drinking water and sewage. The local advisory groups may input into the assessments of water and wastewater required under LGA 2002.

## **Arrangements for cross-sectoral infrastructure advice**

127. There is no single cause of the infrastructure stresses that have occurred. Electricity failures have been due to inadequate market governance arrangements, and to uncertainties about the regulatory environment, generation fuel availability and cost. Auckland's transport difficulties have been primarily due to local authority governance and funding failures. Water allocation difficulties are attributable to poorly developed strategic planning and allocation frameworks. However, the effect of the failures is

the same – erosion of infrastructure providers' and users' confidence and shortcomings in delivery of sustainability objectives.

128. Present institutional arrangements for delivery of infrastructure policy and advice feature leadership by Infrastructure Ministers, advice prepared by Ministries with sector-specific responsibilities, supplemented by special purpose interdepartmental processes such as the IWG, the SDPoA Officials Co-ordinating Group, the Officials Committee on Sustainable Energy and the Joint Officials Group on Auckland transport. Main accountabilities are set out in Statements of Intent and associated documents.
129. Advice on infrastructure policy and performance will continue to be organised on a sector-specific basis, with lead Ministries reporting to Ministers with sector-specific responsibilities and with a range of issues being considered by Infrastructure Ministers.
130. Officials will continue to co-ordinate work on a limited number of cross-sectoral issues, including promulgation of the findings of the Stocktake, commissioning future infrastructure audits, and operationalising the infrastructure theme under GIF by developing budget initiatives related to infrastructure for GIF Budgets (a present GIF role).
131. A contingency budget of \$0.5 million has been agreed for 2004/05. Officials would seek access to these funds if appropriate as work on issues covered in this report gets underway.

## **Funding and financial arrangements<sup>18</sup>**

132. PwC noted that “continued investment across all infrastructure sectors will be required in order to maintain or improve existing quality and, ideally, pre-empt issues that may emerge.”

### **Current and recent investment**

133. Recently the Government has provided significant financial support for infrastructure investment through:
  - Project PROBE (tens of millions of dollars);
  - Whirinaki reserve electricity generation plant (\$150 million);
  - Sanitary Works Subsidy scheme (\$15 million per year over 10 years);
  - Auckland transport package (\$1.6 billion).
134. Commercial providers are also investing heavily in infrastructure:
  - Telecom has signalled that it intends to move to a Next Generation Network, which will involve investment of upwards of \$1 billion over 10 years;
  - Woosh's wireless broadband investment.
135. However, substantial investment is still required in a number of sectors:
  - Transpower has estimated that total grid investment requirements over the next 10 years are around \$1.5 billion;

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<sup>18</sup> Funding refers to the revenue stream from which funds for investment in infrastructure are made available, e.g. user charges, general taxation. Financing refers means by which that revenue stream is shifted through time, e.g. by borrowing. Financing measures do not increase the total amount of revenue available unless it is associated with an additional revenue stream, e.g. road tolling.

- Investment in electricity generation is required to cover ongoing growth in demand (this becomes even more acute following Meridian's decision not to proceed with Project Aqua);
- The Crown has agreed to spend up to \$200 million on capital works for the rail network (in the process of being returned to Crown ownership) but this may not be sufficient to address deferred maintenance issues, let alone new investment;
- Investment of between \$100 - \$300 million from drinking water suppliers is required. In addition, the Crown will be asked to contribute a proportion of this on a similar basis to the Sanitary Works Subsidy Scheme.

136. The companies concerned meet the majority of infrastructure funding requirements. The PwC report did not identify that access to capital is a wide-ranging constraint on infrastructure investment.<sup>19</sup> Infrastructure funding and ownership arrangements have evolved on a sector-specific basis. Case by case decisions are taken by the Government when necessary to address particular needs, e.g. reserve generation levy, Auckland transport funding package, forestry roads for regional development, and the Sanitary Works Subsidy Scheme.

137. The Government's capital investment decisions are taken within the Budget process. This allows integrated decision making across capital spending proposals and to strike an appropriate balance between capital and operating spending. The capital Budget process now includes SOE capital injections.

138. Some local authorities are experiencing infrastructure funding pressures. In general, the funding for improved infrastructure must come either from increased revenue (generally rates increases) or reductions in local government service(s).<sup>20 21</sup>

### **Infrastructure Bonds**

139. Treasury is currently developing options, with the Department of Labour, for the issue of infrastructure bonds. Infrastructure bonds could be issued to the public (commercial or retail) or migrant investors' capital could be held as an infrastructure bond. The proceeds from the bonds could then be on-lent to finance infrastructure investment. For example, the Government could issue infrastructure bonds and on-lend proceeds to Transit to fund construction of a toll road.

140. Work on infrastructure bonds is currently at an early stage and observations about risks and opportunities are tentative. Infrastructure bonds enable a closer linkage between raising the finance and the application of the funds. However, public infrastructure bonds may be more expensive to raise than government debt. The extent of the additional cost will depend on the exact nature of the bonds. Migrant

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<sup>19</sup> MAF is currently examining options for addressing impediments to irrigation development. This will include consideration of funding issues which MAF has identified as a possible constraint on irrigation infrastructure deployment.

<sup>20</sup> A recent study by MOTU Economic and Public Policy Research (January 2004) found that reliance on local tax bases to fund local services has some potentially serious consequences. Poorer local authorities have lower tax bases per capita; the level of services local authorities can afford varies greatly. This means that firms located very close geographically could have very different rates and services. In addition, "uncontrolled external shocks" or even normal patterns of growth and decline can dramatically alter population and tax bases. MOTU suggests investigating "revenue sharing" across territorial authorities as possibly being a more equitable and efficient way of funding local services.

<sup>21</sup> The Department of Internal Affairs has initiated a review of local government funding. See Attachment 2 for details.

infrastructure bonds may be cheaper than conventional bonds, but this cost advantage would be obtained from requiring migrants to invest, rather than the bond itself.

141. It is recommended that Cabinet invite the Minister of Finance to report to Infrastructure Ministers on the issues with infrastructure bonds and with options for the introduction of infrastructure bonds, by 30 November 2004.

## **Growth and Innovation Advisory Board's views**

142. GIAB considers that:

- There is a need for an increased level of long-term analysis to improve future preparedness;
- There is a need to increase collaboration between government, business users, and infrastructure investors and operators, to identify emerging infrastructure needs, particularly those of high value export-oriented businesses, and collaborate on efficiencies or improved provision – a “whole of nation” approach may be optimal in some instances;
- Infrastructure policy and planning needs to explicitly allow for linkages and interdependencies between infrastructure sectors. Particular areas where GIAB suggests more explicit recognition of linkages are across transport modes, and between transport and energy;
- There is a need to ensure that ICT capability is optimal to facilitate the passage of both goods and information, to support exporters to better meet cross-border and in-market security and assurance requirements, and to optimise the selection of transport modes.

143. GIAB's perspectives have been taken into account in developing proposals in this paper.

144. GIAB has identified a need to better understand opportunities for improving businesses' access to transport services for getting export goods to market, and is currently undertaking a project on transport infrastructure servicing exports (tourism is not covered).

## **Publicity**

145. If Cabinet agrees, the Minister for Economic Development will take responsibility for announcing the Stocktake findings, in the week beginning 17 May 2004.

146. It is noted that the 2004/05 Budget contains three GIF infrastructure initiatives:

- The contingency bid noted in paragraph 131 above. It is proposed that this be incorporated into the Minister for Economic Development's Stocktake announcement.
- A subsidy scheme to assist small communities servicing large tourism activities to finance appropriate drinking water treatment and sewerage infrastructure, referred to in paragraph 66 above. The Minister of Tourism is intending to make a pre-Budget announcement on this.
- Improved sustainable energy modelling. The Minister of Energy has no plans to publicise this initiative.

147. It is proposed that this Cabinet paper, and the consultants' reports, be released on MED's website for public information and comment. Officials will draw key issues arising to Ministers' attention.

## Consultation

148. This report was prepared by MED in consultation with the IWG. The following agencies were also consulted and provided comment on the paper which has been incorporated: Ministry of Health, Statistics New Zealand, Transfund, Ministry of Civil Defence and Emergency Management, and the Foundation for Research Science and Technology. Other agencies consulted are Transit, Department of Conservation, Office of the Auditor General, Te Puni Kokiri, Ministry of Research, Science and Technology, State Services Commission, Ministry of Social Development, and New Zealand Trade and Enterprise.

## Human rights

149. There are no Human Rights Act issues.

## Recommendations

150. It is recommended that the Committee:

### Role of infrastructure in the economy

1. **Note** that sound infrastructure and the services it provides have an important role to play in meeting the government's sustainable development objectives;
2. **Note** that investors across the economy need confidence in arrangements for the provision and regulation of infrastructure if they are to commit funds to new projects;

### Current infrastructure issues

3. **Note** that New Zealand's unique characteristics present a challenge to cost effective and secure infrastructure provision;
4. **Note** that the PricewaterhouseCoopers (PwC) audit provides a "snapshot" of the state of current and future infrastructure assets and that the report did not identify any unrecognised issues that might pose a serious barrier to growth and sustainable development objectives;
5. **Note** that the Associate Minister for the Environment is leading a work programme to address RMA issues, the Minister of Energy is leading on energy security, and the Minister for the Environment is taking responsibility for ensuring that overall water allocation issues are progressed;

## Infrastructure policy framework

6. **Agree** that the following objective for New Zealand's infrastructure policy be adopted:

*“To enhance infrastructure's net contribution to economic growth and societal well-being over time, while reducing the incidence and severity of service failures and adverse effects on the environment”;*

7. **Note** that a key imperative is to ensure infrastructure will be sufficient to support both the Growth and Innovation Framework objective of returning our per capita income to the top half of the OECD and the Government's sustainable development objectives;
8. **Note** that infrastructure policy issues will need ongoing government attention, and that this will include ensuring that relevant policy settings are designed to:
- Monitor infrastructure issues actively;
  - Facilitate a smooth response to new infrastructure pressures as they emerge;
  - Reduce the incidence and severity of unexpected service failures; and
  - Assist transitions such as those arising from technological changes and shocks (including disasters);
9. **Note** that officials have identified five “principal infrastructure functions” where good performance is necessary if the policy and delivery agencies are to make their best contributions to sustainable infrastructure arrangements, the five functions being:
- Promoting government outcomes
  - Establishing infrastructure policy settings
  - Monitoring
  - Futures analysis
  - Emergency management liaison;
10. **Note** that officials (MED lead) will take steps to ensure that agencies with infrastructure policy roles are informed of key learnings from the Stocktake, and that this will include attention to the issues in recommendations 8 and 9;

## Performance of current infrastructure arrangements

### Overview

11. **Note** that officials assessed how well the current policy settings aligned with sustainable development objectives and concluded that sustainable development objectives are a common theme in the policy settings and that current Sustainable Development Programme of Action work programmes on water, energy and cities will help ensure that sustainable development principles are applied in practice;

### Statistical issues

12. **Note** that a need has been identified for improved infrastructure performance benchmarking against international practice and for improved infrastructure information to inform policy development and goal setting, and to monitor implementation;
13. **Note** that while there is extensive data available through a range of statistical and indicator programmes, and recent investments in improved statistics and strengthening of the official statistical system will help improve the range of

relevant data about the state, performance and demands placed on infrastructure, some significant gaps remain;

14. **Agree** that MED and Statistics New Zealand, together with other relevant agencies, should undertake further work to establish the information requirements for monitoring New Zealand's infrastructure, and report back to Cabinet by December 2004;

#### ***Audits***

15. **Note** that the infrastructure audit conducted as part of the Infrastructure Stocktake has been valuable in helping to establish a basis for the state of current and future infrastructure assets;
16. **Agree** in principle that future infrastructure audits be conducted every three years;
17. **Note** that, subject to agreement with recommendation 16 above, officials (MED lead) would advise on audit needs for the 2006/07 financial year, and that recommendations would be accompanied by funding requests;

#### ***Asset management plans***

18. **Note** that asset management planning by infrastructure providers can assist delivery of the required service levels through cost-effective creation, acquisition, maintenance, operation, rehabilitation and disposal of assets to provide for present and future infrastructure needs;
19. **Note** that the Local Government Act 2002 requires the Local Government Commission to review the Act as soon as possible after the 2007 local authority elections and that this will include council planning procedures;
20. **Agree** that the 2007 review of the Local Government Act 2002 should include whether there is a need for a more comprehensive approach to asset management planning requirements in respect of assets owned or controlled by council-controlled organisations;

#### ***Sector engagement and regional partnership programmes***

21. **Note** that MED will ensure that specific infrastructure dimensions are included in sector engagement and regional partnership programmes;

#### ***Arrangements for cross-sectoral infrastructure advice***

22. **Note** that arrangements for development of policy and advice on infrastructure issues will continue, as at present, to be the responsibility of the relevant Minister and agencies with sector responsibilities, supplemented by cross-Ministry committees such as the Interdepartmental Working Group on Infrastructure;

#### ***Funding and financial arrangements***

23. **Note** that Treasury is conducting work on whether infrastructure bonds should be introduced in New Zealand, and if so, on bond design features;
24. **Invite** the Minister of Finance to report to Infrastructure Ministers on the issues associated with infrastructure bonds and with options for the introduction of infrastructure bonds, by 30 November 2004;

## **GIAB issues**

25. **Note** that the Growth and Innovation Advisory Board plans to conduct analysis of the linkages between ports and airports, and other transport infrastructure, including discussions with infrastructure users and providers (excluding the tourism industry), and that the Board will report to Infrastructure Ministers by late 2004;

## **Publicity**

26. **Agree** that the Minister for Economic Development take responsibility for announcing the Stocktake findings; and
27. **Agree** that this Cabinet paper and the consultants' reports be released on MED's website for public information and comment.

Hon Dr Michael Cullen  
**Minister of Finance**

Hon Jim Anderton  
**Minister for Economic Development**

# Attachment 1

## Summaries of consultant reports

### ***Audit: Assessment of the quality of current and future infrastructure (PricewaterhouseCoopers)***

1. Broadly, New Zealand's infrastructure is in reasonable shape. No new issues have been identified that might pose a serious barrier to growth and sustainable development objectives.
2. However, some significant local and sector-specific issues have been identified:

#### *Energy*

- Investment required in electricity generation and transmission
- Risk management and demand management under-developed
- Uncertainty over generation fuels – is gas exploration sufficient? Is coal likely to be viable? Will Aqua proceed?

#### *Transport*

- Condition of roads generally good, but there are exceptions - major congestion in Auckland (governance issues are a concern), less significant congestion elsewhere
- Road charging structure provides few price signals, and environmental externalities not priced
- Need for improved integration of integrated planning and transport management in some areas
- Under-investment in rail – deferred maintenance, tunnel sizes etc.
- Some concerns regarding transport links around ports and airports.

#### *Water*

- Quality of drinking water generally satisfactory (a few exceptions)
- Significant issues around the handling of competing demands
- Few price signals
- Concerns regarding wastewater in some tourism areas.

#### *Telecommunications*

- Technological advances reduce constraints and promotes competition
- New Zealand has avoided the excesses of recent overseas booms
- Some availability and quality issues in rural areas
- Household uptake of broadband is low.

3. PwC also mention some over-riding themes
  - Regulatory uncertainty (e.g. electricity, telecommunications) and planning difficulties (RMA) as an impediment to investment
  - Insufficient development of pricing mechanisms impedes demand management (e.g. roads and water / sewage)
  - Continued investment likely to be required in all sectors.

***Sustainability: Determining the nature of the links between infrastructure and sustainable development (Maarama Consulting)***

4. The four sustainable development dimensions are equally important. Thus infrastructure policy development should be looking for win-wins, advising Government on trade-offs, and attempting to decouple infrastructure provision from economic growth.
5. Infrastructure policy should also ensure that externalities are taken into account in decisions on:
  - Consumption – to ensure that demand management reaches full potential
  - Investment – to ensure that supply options are adopted only where needed
  - This requires a combination of pricing solutions and attitudinal change (including information provision and quadruple bottom line (QBL) reporting)
6. Key issues are:
  - Energy – decarbonisation and decentralisation (including increased use of renewables and distributed generation), demand management
  - Transport – congestion, especially in Auckland (including increased use of “active modes” and demand management)
  - Water – allocation issues, decentralisation and demand management
  - Telecommunications – capturing economic and social benefits, risks around the digital divide.
7. Infrastructure priorities for action are: Auckland transport, electricity decarbonisation and integrated water solutions.

***Policy: Development of best practice policy framework taking into account sustainability objectives (NZIER)***

8. Characteristics of infrastructure
  - high fixed costs and low marginal costs
  - high sunk costs and risk of stranding
  - diverse users
  - long investment lead times.
9. Sustainable development objectives as policy goals: maximising GDP subject to “supplementary checks” on environmental, social and cultural outcomes.
10. Potential market failures include:
  - market dominance
  - public and merit goods
  - information and co-ordination failures
  - externalities.
11. Risks associated with the costs of regulation, e.g. unintended consequences and administration and compliance costs, also need careful attention.

12. Solutions may include:
- market creation (including defining property rights, ensuring information provision and other steps to promote competition)
  - market adjustment (including price adjustment, standard setting and structural interventions)
  - public provision and joint ventures.
13. Identification of policy issues, including trend analysis, defining opportunities and threats, instrument selection and determining the agency best placed to achieve change.

**Growth: Review of the literature on the relationships between infrastructure and growth (Pinnacle Research)**

14. Infrastructure contributes to economic growth by raising the productivity of other factors of production through:
- reducing costs of production, thereby raising profitability, production, income and employment
  - increasing the attraction of a locality for new investment
  - promoting efficient allocation of resources through easier access for labour and materials to particular localities, and allowing alternative activities, employment opportunities and investment to emerge
  - providing the necessary economies for urban agglomeration and unleashing the productive capacity of labour and capital endowments.
15. Conditions likely to maximise the contribution of infrastructure to economic growth are:
- a macro-economic climate conducive to efficient resource allocation, avoiding inflationary funding arrangements and “crowding-out” of other more efficient investment
  - application of user charges that reflect supply and demand conditions and externalities
  - emphasis on use of non-infrastructure solutions such as demand management
  - the capability of other input factors (such as labour) to raise factor productivity – infrastructure cannot create economic potential, only develop it where appropriate conditions exist.

## Attachment 2

### Infrastructure-related work programmes

1. This attachment describes the main recent and ongoing government work programmes that impact directly on infrastructure.

#### ***Cross-sector***

2. *Sustainable cities*: The Sustainable Development Programme of Action work programme is being led jointly by the Ministry of Economic Development (MED) and the Ministry for the Environment (MfE), and is initially concentrating on Auckland. There are seven work streams identified under the Sustainable Cities umbrella including transport, urban form and design, and the Auckland Regional Economic Development Strategy. These work streams are supportive of major infrastructure initiatives such as the Investing for Growth package on Auckland transport infrastructure. They enable integrated work on a number of fronts to contribute to better integration of Auckland's land use and transport development. A specific example is the current work on innovative approaches to peak traffic congestion.
3. *Sustainable Development indicators*: Statistics New Zealand is undertaking a multi-year sustainable development indicators work programme, which will develop high level sustainable development indicators, including "decoupling" indicators, for New Zealand. It is expected that some of these will be relevant to infrastructure, but that they would be insufficient, on their own, to inform infrastructure investment or policy decisions.
4. *Infrastructure R&D investment*: GIF identified a "solid research development and innovation framework" as important to building New Zealand's economy. The Foundation for Research Science and Technology (FRST) has restructured its investment portfolios to reflect GIF and SDPoA principles and is now developing a new investment strategy for infrastructure R&D to take account of Government and industry priorities. FRST invests approximately \$30 million of taxpayer dollars annually in infrastructure R&D. The IWG has provided the consultants' reports to FRST and MoRST, in addition to meeting with officials from both agencies, to ensure that the new investment strategy takes account of the outcomes of the Infrastructure Stocktake programme.
5. *Local government funding review*: The Department of Internal Affairs has initiated a review of local government funding to:
  - Examine the impact of community expectations on present and future local government funding requirements;
  - Examine the impact of other regulatory requirements (both recent and anticipated) on present and future local government funding requirements;
  - Explore the issue of affordability in relation to present and future local government funding requirements;
  - Identify the degree to which any identified pressures are likely to be resolved by recent changes to councils' funding powers and examine appropriate solutions where gaps might be identified; and
  - Develop criteria to review and assess the merits of any additional funding arrangements that might be found to be necessary.

The outcomes of the review will be reported to a Central Government / Local Government Forum meeting scheduled for late 2004.

6. *Tourism infrastructure requirements:* The Ministry of Tourism secured three years of funding through the Cross Departmental Research Pool for a project to examine capacity requirements in light of increasing visitor numbers. This project is at an initial scoping stage, but the intent is to apply tourism forecast data to the existing infrastructure demand models used by a wide range of public sector agencies (for example, transport). Where such models do not exist, as appropriate, the project will explore options for developing models or proxies with the aim of identifying key choke points and/or bottlenecks in terms of tourism infrastructure provision, providing a basis for developing solutions in advance of reaching capacity constraints.

## **Energy**

7. *Sustainable Energy:* The SDPoA work programme on energy is developing a framework for considering energy issues going forward. The framework will provide a clear articulation of long term goals for sustainable energy, an explanation of how current policy settings contribute to those goals, and a discussion of areas where a sharper policy focus is required, taking into account an assessment of trends in the external environment relevant to New Zealand's circumstances. The framework is intended to provide a basis for more informed decision-making by central and local government and by market participants, including in relation to energy infrastructure. This work includes consideration of the transport aspects of energy use.
8. *Electricity governance and reserve energy:* The governance of wholesale electricity arrangements has now been transferred to the Electricity Commission. The Commission will recommend to the Minister of Energy any changes that are required to the governance regulations and rules in the future. The Commission is also responsible for taking reasonable steps to ensure security of supply in a "one in 60" dry period by contracting for reserve energy and requiring information disclosure by generators. MED is working closely with the Commission to promote security of supply in the 2004 and 2005 transitional period.
9. *Gas governance:* Parliament is currently considering amendments to the Gas Act 1992 to provide backstop regulation-making powers for the gas industry (provisions similar to those in the Electricity Amendment Act 2001). It is proposed that if the gas industry fails to make sufficient progress towards meeting the expectations of the Government (as articulated in the Government Policy Statement issued in March 2003), the Minister of Energy will establish an *energy* commission which will recommend regulations and rules to the Minister of Energy. In response to this, the industry has proposed an alternate co-regulatory model of governance, whereby an industry body will have the power to levy and sanction its members. These issues are currently before Cabinet for consideration.
10. *Commerce Commission "control" inquiry:* The Commerce Commission is undertaking an inquiry into gas pipelines in response to a request from the Minister of Energy. The Minister has requested the Commission report by 1 November 2004 with a recommendation as to whether gas services should be controlled under the Commerce Act. In making its recommendation the Commission will consider whether competition is limited in the market and whether it is in the interests of consumers that control be imposed.
11. *Distributed generation:* MED is developing regulations to facilitate the connection of distributed electricity generation to distribution networks. The regulations will provide

greater certainty and clarity about timing and costs associated with obtaining interconnection and are expected to be in place about August 2004. The Electricity Commission will be responsible for monitoring the regulations and recommending any future amendments.

12. *Gas exploration*: Consideration is being given to possible policy changes to strengthen incentives for increased gas exploration.

## **Water**

13. *Waitaki water allocation*: The Resource Management (Waitaki Catchment) Amendment Bill 2003 amends the Resource Management Act 1991 to deal with significant, competing proposals seeking to use the limited water resources of the Waitaki catchment and provides for the establishment of a statutory board to devise a water allocation plan for the catchment as well as a process whereby the merits of the various applications can be considered. The future of this legislation is currently under review.
14. *Drinking water quality*: Drinking water standards are proposed that will require all drinking water suppliers to take all practicable steps to meet the drinking water standards. The Ministry of Health has a project underway examining the options for providing assistance to drinking water suppliers to help them meet the requirements of the proposed Health (Drinking Water) Amendment Bill. The outcome of the project is likely to be a scheme along similar lines to the Sanitary Works Subsidy Scheme currently in place to assist with funding sewerage schemes in small communities.
15. The Ministry of Health notes that it is intended that small suppliers will have up to 5 years to comply with the new standards, and that the draft legislation will take a proportionate approach to risk: i.e. the greater the level of population served, the greater the level and scale of monitoring for drinking water safety purposes. The new legislation will encompass the concept of “all practicable means” which in effect requires small suppliers to do only what is practicable. However, given current international experience, most suppliers are expected to be able to adapt existing drinking-water safety technologies to small-scale community situations with operating costs scaled to suit.
16. *Water supply catchments management* – the Ministry for the Environment is currently developing a national environmental standard on human drinking water sources. This will complement the proposed Bill to provide better management of human drinking water from “source to tap”. The national environmental standard is expected to involve monitoring, grading and reporting of suitability of human drinking water sources, and an assessment of risk of contamination in the catchment.
17. *Promoting water demand management* – SDPoA may examine tools to improve efficiency and education programmes to improve behaviour leading to less demand for water (project outcomes have yet to be determined). Some local authorities are undertaking environmental education to encourage water efficiency and changes in behaviour of public and industry to reduce water use and pollution discharges into water.
18. *Funding of irrigation infrastructure* – the Ministry of Agriculture and Forestry is currently examining options for addressing impediments to irrigation development. This work will be linked with the SDPoA water work programme and MED’s regional development work programme.

19. *Tourism water and wastewater infrastructure project*: In 2003, MED, with the Ministry of Tourism, commissioned research into the tourism demand on water and sewerage infrastructure in four case study areas – Rotorua, Kaikoura, Queenstown Lakes and Stewart Island. The study concluded that small communities with small ratepayer bases and high visitor numbers may be unable to fund the upfront capital investment required to build water and wastewater infrastructure that is adequate to meet the additional visitor demand. A subsidy scheme is to be introduced in the 2004/05 Budget, and other forms of assistance such as capacity building will be addressed. Such communities do, however, have the mechanisms to fund operating costs.

## **Transport**

20. *Land Transport Management Act 2003*: Amongst other things the LTMA permits public private partnerships in road provision and has extended the objectives of transport agencies to include the Government's sustainable development objectives. Improved integration of planning documents, including recognition of demand management and passenger transport options are also required by the LTMA. The transport sector is presently in a transitional phase in adopting these requirements.
21. *Regional Transport Fund*: This fund, managed by Transfund, was established to encourage regional development (covering roading and alternatives to roading) under the 2002/03 National Land Transport Programme. \$22.5 million per annum is available for expenditure on regions with acute needs. Expenditure is currently focused on the acute-need regions of Northland and Tairāwhiti, which have suffered from under-investment in transport infrastructure and increasing pressure on their roading, particularly from the forestry sector.
22. *Surface Transport Costs and Charges study (STCC)*: The Ministry of Transport is considering the costs associated with the use of various land transport modes and their implications for achieving the objectives of the New Zealand Transport Strategy. The aim of this work is to improve New Zealanders' understanding of the costs imposed by land transport on the economy, society and the environment, and what level of charges are currently applied to cover these costs. It considers both road and rail transport. This work will inform future decisions on the level and allocation of transport related costs and charges within the economy and across transport.
23. *Travel demand management*: The Travel Behaviour Change Steering Group is an informal cross-agency group formed in December 2003 to clarify funding arrangements for a range of travel behaviour change and travel demand management initiatives. The Ministry of Transport facilitates the Steering Group and Transfund, the Energy Efficiency and Conservation Authority (EECA), the Land Transport Safety Authority (LTSA) and the Ministry for the Environment (MfE) were founding participants. Other agencies, including the New Zealand Police, Ministry of Health and Ministry of Education, will be invited to participate.
24. *Auckland land transport (funding)*: This component includes (subject to the acceptance and implementation of governance and regulatory issues):
- A 5 cents a litre increase in fuel excise duty (FED) and an equivalent increase in light road user charges (RUC) on diesel vehicles from 1 April 2005 (legislation required);
  - Regional allocation of these additional funds and a further \$900m allocation to Auckland from the Crown Account over the next 10 years;
  - Indexation of FED and RUC (legislation required).

25. *\$200 million investment in rail:* As part of the agreement with Toll Holdings Limited for the Crown to purchase the track and associated infrastructure, the Crown will invest \$200 million over 5 years to upgrade the rail infrastructure to improve its performance, efficiency safety and reliability.
26. *Funding of passenger clearance services:* Recovery of costs at the border (from government agencies for the cost of providing bio-security, customs etc.) is under consideration. One of the options would result in greater costs for smaller regional airports than for larger airports with higher passenger flows. This could have implications for the viability of those airports and hence have follow-on effects across other infrastructure in those regions.

### **Telecommunications**

27. *Project PROBE:* the Government has subsidised the rollout of broadband so that it will be available to all schools and communities by the end of 2004. This initiative will also result in increased competition in the market for broadband. Project PROBE is currently in its implementation phase.
28. *Advanced network:* an Advanced Network provides the very high bandwidth needs necessary for universities and other research institutions. New Zealand is one of only a few developed countries that does not have an Advanced Network in place. A business case for an Advanced Network in New Zealand is currently under development – this is being led by MoRST in collaboration with MED and other agencies.
29. *Digital strategy:* there is concern that the productivity benefits that use of ICTs can generate are not being realised. A Digital Strategy is currently under development which will set out means by which the necessary conditions can be created and how the benefits may be realised, including the respective roles of government, communities and private providers.
30. *Local loop unbundling:* officials are providing advice on the Telecommunications Commissioner's report regarding unbundling of the local loop. This is a complex issue and the decision will have significant implications for the form of investment in the sector, competition and user outcomes. A decision by the Minister of Communications is expected in May 2004.

## Attachment 3

### What is required for good quality infrastructure policy and planning?

1. Based on analysis of the output from the various work streams, officials identified several critical issues for good quality infrastructure policy and planning.
2. Growing and maintaining an economy's reputation as an attractive location for investment requires assurance that high quality infrastructure will continue to be provided at reasonable cost, with arrangements for managing price volatility. This calls for:
  - integration of infrastructure developments across sectors and regions;
  - high quality asset management planning practices; and
  - regular audit and/or ongoing monitoring against a comprehensive range of indicators<sup>22</sup> in order to identify bottlenecks in a timely manner.
3. Where infrastructure is provided within a commercial framework, firms will invest in infrastructure if they expect to receive a reasonable return on that investment. Factors that impact on commercial investors' expected rates of return include:
  - General economic conditions, e.g. cost of capital
  - Demand conditions, e.g. household disposable income
  - Supply conditions, e.g. behaviour by competitors, input costs
  - Regulation and regulatory (un)certainty.
4. Intervention in infrastructure sectors should only occur when it is necessary to achieve the Government's objectives. Factors that suggest a need for government intervention include:
  - Market dominance by providers resulting from natural monopoly characteristics
  - Lack of information for market participants
  - Co-ordination failures impeding the effectiveness of networks as a whole
  - The existence of positive<sup>23</sup> and negative externalities
  - The public good characteristics of some infrastructure services, e.g. non-excludability
  - Differences between societal and commercial providers' objectives for investment, e.g. supply security and equitable access versus profit maximisation.
5. When intervening in infrastructure, the Government should consider the net benefits. Care should be taken to avoid regulatory failures such as:
  - Contributing to over-supply and asset stranding
  - Imposition of excessive costs on providers and users
  - Regulatory uncertainty and undue reduction of expected rates of return, impeding investment

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<sup>22</sup> Indicators should cover demand-side factors such as the quality of service and user satisfaction as well as supply-side measures such as physical asset stocks and financial performance.

<sup>23</sup> Positive externalities arise when there are benefits of infrastructure investment over and above those captured by the supplier. In the case of broadband infrastructure, investment may stimulate horizontal productivity gains or contribute to achievement of social objectives. A private supplier would not capture these external benefits and may therefore invest to a level below that where net benefits are maximised, or in a timely manner.

- Creating allocative and dynamic inefficiency by distorting price signals, e.g. when intervening to promote equity for target populations
  - Use of inappropriate financing / funding mechanisms, e.g. those that “crowd out” more efficient investment by the private sector.
6. Government needs to select interventions appropriate for each instance. Possible interventions include:
- market creation and facilitating competition
  - market adjustment, e.g. price adjustment through taxes, subsidies or regulation
  - public provision
  - other behaviour changing instruments, e.g. education, information, “norm shifting”, arbitration and facilitation or income redistribution, quadruple bottom line reporting.
7. A substantial amount of capital is invested in infrastructure in New Zealand. The magnitude of capital invested in infrastructure sectors means that there is an emphasis on facilitating efficient and effective management of these assets, including re-investment and maintenance practices.
8. To achieve sustainability objectives, infrastructure policy should encourage:
- Sustainable use of scarce resources
  - Demand management through pricing, education and other behaviour-changing instruments<sup>24</sup>
  - Efficiency improvements in supply
  - Innovative solutions such as use of smaller scale alternatives and alternative supply sources.
9. Government policy should facilitate identification of tradeoffs and complementarities among sustainable development objectives. Decision-makers should be provided with high quality information that allows them to make informed decisions.
10. Government policy should facilitate identification of relevant externalities and, where possible and appropriate, ensure these are taken into account when decisions are taken on:
- consumption, to encourage demand management
  - investment, to ensure supply options are adopted only where necessary.
11. National and regional economic, environmental and social impacts of infrastructure investment should be considered via inclusive, well-resourced planning processes.
12. Governance arrangements should facilitate:
- Co-ordination of infrastructure services, e.g. where service provision crosses Territorial Authority boundaries
  - Efficient market operation, e.g. rule development and enforcement
  - Secure service provision, including a clear understanding of roles and responsibilities.

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<sup>24</sup> In many instances, successful demand-management programmes require alternative modes of service to be available to users.

## Attachment 4

### Infrastructure Policy Framework:

#### Identifying appropriate government intervention

1. The following policy framework is intended to help answer the questions: Are infrastructure policy settings “right” within each infrastructure sector? Are governance arrangements appropriate for each infrastructure sector?
2. The policy framework in the table comes from a variety of sources, including the following:
  - NZIER report
  - Maarama report
  - Various “diagnostic papers” prepared by the IWG.
3. The framework is built around a series of “tests” designed to ascertain if there are market failures or other characteristics associated with the infrastructure sector under observation that might require government intervention to alleviate / address. Hence there is the “test” question, followed by a description of potential causes of market failure or issues that might arise, and identification of some of the appropriate “policy tools” to address this failure.
4. To apply a test to an infrastructure sector, one would ask, for example, “are there public goods and/or market dominance concerns?” The initial response is to describe the nature of the goods (rival, non-rival, etc) and market characteristics and the existing policy settings. This is followed by a judgement as to whether the current policy settings are adequate to address the public good or market characteristics or if a better means of handling this particular “failure” is available. As noted above, the framework offers some guidance on possible policy tools and/or settings for addressing particular issues.
5. The policy framework takes into account the ten principles of the Sustainable Development Programme of Action, and is designed to assist in achieving the infrastructure policy objective: *“to enhance infrastructure’s net contribution to economic growth and societal well-being over time, while reducing the incidence and severity of service failures and adverse effects on the environment.”*
6. The framework provides information on identifying appropriate government intervention in the generic sense. A second, but non-trivial question is assigning the roles between local and central government. This requires the consideration of two factors: (1) the principle of subsidiarity: wherein a collective policy response is devolved to the lowest level of collective authority capable of dealing with it, and (2) the area of geographical impact (e.g. local air pollution issues are generally best dealt with by local government, while greenhouse gas emissions may need to be addressed at the national level).

7. The policy framework does not explicitly consider:
- Funding issues, as these are a separate concern that needs to be addressed once it has been determined that there should be a central or local government intervention and is influenced by the nature of the intervention itself.
  - Ownership issues, such as private vs. public ownership and central vs. local government ownership.
  - Emergency management issues where the government has a legitimate role in establishing overarching arrangements to ensure that communities are protected against natural disasters and acts of terrorism. Rather, this policy framework is providing guidance for sector-specific infrastructure policy decisions.

**TEST: Is there sufficient infrastructure sector monitoring / information for government to know if and when to intervene in a timely fashion?**

This is a fundamental test in the framework, and could be said to provide the basis for assessing all of the remaining tests.

Decision-makers should have access to high quality information that allows them to make informed decisions. Hence, it may be necessary to provide sufficient information to:

- Establish drivers of demand for infrastructure services, monitor trends in these drivers and form expectations about future movements (“futures analysis”)
- Identify possible “bottlenecks” or pressure points
- Ensure the security and reliability of infrastructure capital stock to meet current and anticipated demand – including resource supply, capacity, condition, uptake of infrastructure alternatives and efficiency
- Monitor the appropriateness of provision of goods currently deemed as “public” in face of changing conditions, especially technological change
- Ascertain that infrastructure is making a positive contribution to (and minimising adverse impacts on) sustainable development
- Monitor the performance of Government policy and public agencies, e.g. to assess whether policy intervention might achieve improvement
- Establish the community’s redundancy requirements (e.g. dry-period security of supply).

This requires the provision of a range of quantitative and qualitative information.

**TEST: Are there public goods and/or market dominance concerns?**

***Potential causes of market failure***

- Public good (non-rival, non-excludable)
- Market dominance: natural monopoly (high sunk costs, economies of scale).

### ***Policy tools to mitigate failure***

- Policies to establish competitive markets where possible (including definition of property rights and regulation to promote fair competition)
- Public: planning, policy making, finance, ownership
- Private sector finance and ownership under public regulation
- Contestable service operation, e.g. bidding to operate with government monitoring of performance
- Regulation to allow other services fair access to use of the facility
- Price regulation.

### **TEST: Are externalities present that require “internalisation”?**

#### ***Potential causes of market failure***

- Externalities can be created in the production of an infrastructure service (e.g. air pollution from coal generation) or in its consumption (e.g. congestion arising from use of roads)
- May be local, national or global.

#### ***Policy tools to mitigate failure***

- Regulation (e.g. zoning, technical standards)
- Fiscal instruments (e.g. taxes, fees, subsidies)
- Promoting behavioural / attitudinal change (e.g. through education, information provision, voluntary agreements, QBL reporting).

### **TEST: Are societal objectives (quality of life, including access and equity) being achieved?**

#### ***Potential causes of market failure***

- Merit goods
- Social redistribution.

#### ***Policy tools to mitigate failure***

- Regulation (e.g. universal service requirements)
- Investment planning (e.g. of regional spread)
- Public financing of non-commercial services deemed socially important
- Empowering all New Zealanders to participate in decisions affecting them
- Ensuring all New Zealanders have access to key services.

### **TEST: Are the institutional arrangements structured to avoid information or co-ordination failures and permit the uptake of new technology?**

**Key issue:** Are the institutions able to promote smooth adjustment to new technology, supply shocks, demand changes, etc.?

#### ***Potential causes of market failure***

- **Information failure** within and across sectors: valuable information which is not procured because of potential free-riding (usually fragmented market present)
- **Co-ordination failure** within and across sectors: e.g. may occur in networks when there is no clear set of operating rules, or no single operator in a position to enforce those rules, possibly exacerbating congestion and bottlenecks across the network

- **Uptake of technological change.**

***Policy tools to mitigate failure***

- Co-ordinate provision of information – may be publicly funded or through levy / tax
- Regulate for provision of information
- Regulation of investment or operating standards to improve co-ordination in service provision
- Monitor the emergence of new technologies for their contribution to infrastructure provision
- Maintain flexibility in policy to allow uptake – changing policy if required to maintain ability to adopt “innovative” solutions such as use of smaller scale alternatives and alternative supply sources.

**TEST: Is risk being handled appropriately?**

***Demand risk***

*Issue:*

Revenue / financial return is less than expected.

*How can risk be mitigated?*

- Borne by facility operator where a private good (telecommunications, ports, airports)
- Where common pool or public goods are involved, may be appropriate for government to share risk
- Demand and construction cost guarantees have weak justification in terms of risk sharing. A developer or operator usually has more control over construction costs than government, and government is only one of many influences over future demand, and not necessarily the dominant one
- Guarantees for infrastructure investment may create long term potential liability (open financial transactions are generally more transparent and easier to target).

***Political and regulatory risk***

*Issue:*

Future government actions subsequently undermine return from facility.

*How can risk be mitigated?*

- Under control of government.

***Quasi-commercial risk***

*Issue:*

State-owned supplier or purchaser may default on contract with investor under political influence.

*How can risk be mitigated?*

- Government guaranteed returns
- Environmental risk
- Social and cultural risks: where social and cultural outcomes are less than expected.

## ***Environmental risk***

### *Issue:*

Environmental pollution (externalities) as a result of infrastructure construction or service provision.

### *How can risk be mitigated?*

- Borne by provider – performance bonds and liability rules.

## ***Social and cultural risks***

### *Issue:*

Social and cultural outcomes are less than expected.

### *How can risk be mitigated?*

- Impacts are borne by communities affected, thus “communities of interest” are most suitable to manage.

## **TEST: Are there sufficient systems in place to pre-empt regulatory failure?**

### *Types of failure:*

- Information asymmetries
- Imposition of excessive costs on providers and users
- Regulatory uncertainty and undue reduction of expected rates of return
- Creating allocative and dynamic inefficiency by distorting price signals, e.g. when intervening to promote equity for target populations
- Use of inappropriate financing/funding mechanisms, e.g. those that “crowd out” more efficient investment by the private sector.

### *How can risk be mitigated?*

- Government needs to be aware of potential regulatory failures when making the decision to intervene and in selecting instruments
- Performance of Government policy and public agencies and assess likelihood of new policy intervention achieving improvement.

## **TEST: Are trade-offs and complementarities being explicitly considered?**

### *Issues:*

- Fiscal and environmental constraints imply the need to prioritise investment decisions
- Short run vs. long run impacts (what appears as a trade-off in the short term may be a complementarity in the long term).

### *How can risk be mitigated?*

- Government requires sufficient information to make effective trade-offs and decisions
- Infrastructure policies which advance more than one dimension of sustainability, for example both economic and social outcomes (e.g. policies supporting more ‘liveable’ cities), are of special interest.

Attempts should be made to decouple economic growth from pressures on the environment.

## Attachment 5

### Alignment of Infrastructure Sectors with sustainable development objectives

1. Infrastructure investment and consumption of infrastructure services have significant implications for achievement of sustainable development objectives, as infrastructure services:
  - Underpin many aspects of economic and social activity;
  - Facilitate the flow of ideas, goods and services;
  - Facilitate regional economic growth;<sup>25</sup>
  - Are critical to maintain an inclusive, healthy and productive workforce;
  - Involve large scale investment with significant environmental impacts; and
  - Generate a range of externalities in their production and consumption.

#### **Transport**

2. The recent Land Transport Management Act (2003) has brought some of the transport agencies' objectives in alignment with the Government's sustainable development programme (namely, Transfund and Transit). The aim of the LTMA is "achieving an integrated, safe, responsive, and sustainable land transport system". The five objectives of the New Zealand Transport Strategy (2003) are based on sustainable development principles.

#### **Water**

3. The Local Government Act (2002) provides for "local authorities to play a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach." City and district councils are responsible for water and wastewater management, as well as for local roading.
4. The SDPoA specifically targeted quality and allocation of freshwater. The current work programme to achieve the goal of "adequate, clean freshwater for all" is primarily focused on water allocation and use; water quality – managing land use; and the national interest in water.

#### **Energy**

5. The National Energy Efficiency and Conservation Strategy (2001) takes account of sustainability principles. The Government Policy Statements on gas, electricity and electricity governance specify that industry arrangements and electricity provision should be consistent with sustainable development.
6. The current SDPoA work programme on energy is targeted to "ensure the delivery of energy services to all classes of consumer in an efficient, fair, reliable and sustainable manner."

#### **Telecommunications**

7. Given that telecommunications providers are accountable to shareholders, financial objectives are the primary driver for decision-making. To supplement these motivations, the Government has introduced specific policy initiatives such as the Telecommunications Services Obligation, Kiwi Share Obligation agreements and Project PROBE to address social objectives of sustainable development.

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<sup>25</sup> Growth of a region facilitated by infrastructure investment can be at the expense of growth in other regions.

## Attachment 6

### Protection of New Zealand's critical infrastructure

1. An important aspect of national infrastructure management concerns the potential for failure of infrastructure. Following some major disruptions overseas – both accidental and deliberate - a number of countries have begun to examine the vulnerability of their economies, and their societies more generally, to the loss of normal supplies.
2. In New Zealand this issue has tended to be seen as a matter of business continuity, on the grounds that normal commercial imperatives would ensure adequate management of the risk. As a result of doubts about this assumption, and increasing concerns about the potential for sabotage, the Department of the Prime Minister and Cabinet has undertaken some preliminary investigation of infrastructure security.
3. For the purposes of this study, the starting point was the definition of New Zealand's critical infrastructure used in the Cabinet submission when the Centre for Critical Infrastructure Protection (CCIP) was established in 2001:

*"Critical infrastructure is that infrastructure necessary to provide critical services, whose interruption would have a serious adverse effect on New Zealand as a whole or on a large proportion of the population, and which would require immediate reinstatement. New Zealand's critical infrastructure has been identified as those assets and systems required for the maintenance of: governance including law and order and national and economic security; telecommunications and the Internet; energy including electricity generation and distribution, and the distribution of oil and gas; finance and banking; transport; and emergency services." [EXG(01)58]*

4. A small interdepartmental working group has explored possible methodologies for identifying and assessing risks of failure, and then creating control options. This was tested on a few cases, and has shown that formal assessment processes have considerable promise as means of dealing with specific threats or risks. In view of the scale of effort needed to improve the situation, and the lack of a formal mandate, the work was put on hold pending the outcome of the Infrastructure Stocktake. The interim conclusions reported to the Committee of Officials' for Domestic and External Security Co-ordination in June last year were as follows:
  - i. As New Zealanders become more directly dependent on having guaranteed access to reliable infrastructure systems in their day-to-day activities, and as those systems become more complex and interdependent, so too the risk exposure increases for the normal social and economic functioning from both accidental and deliberate disruption.
  - ii. In New Zealand's case, factors such as the small-scale, the lack of redundancy or reserve capacity, and the increasing interconnectedness across different systems, tend to complicate the risks of disruption from technical failures, natural hazards, sabotage, and terrorism.
  - iii. Improving the security of critical infrastructure is a quite different task from the usual practices that constitute national security, and that are normally undertaken by central government. Moreover, while there may in some sectors be a natural congruence between business reasons for avoiding failure and national strategic interests, this point cannot be taken for granted.

- iv. Any efforts to strengthen national infrastructure reliability and security would require a new paradigm based on collective responsibility involving all stakeholders – the private sector, user communities, local government and central government. That process would not be trivial exercise, as the initial efforts in Australia, Canada, UK and US have shown.
- v. While New Zealand's small scale of infrastructure should make it relatively easier, our resources to do the job are small. It is important, therefore, to begin with a good understanding of the full span of national critical infrastructure and assets, their importance, their inter-linkages, vulnerabilities, etc.
- vi. Controlling and mitigating risks to critical infrastructure could add significantly to costs for owners and operators, so efficient investment of resources is of paramount importance if we are to go down that route. For this reason it would be important to use systematic methodologies to ensure that risks/threats are assessed and evaluated realistically, then treated comprehensively. (Critical infrastructure is not an area where some action is better than none; interventions can introduce new risks, and can use resources better applied elsewhere.)
- vii. As yet, no country appears to have developed comprehensive risk management methodologies of the sort that might be used to analyse and manage a nation's total system of infrastructure and assets. A number are working towards such ends, and are investigating risk management methodologies.
- viii. Preliminary work has been undertaken to identify the various sectors of critical infrastructure in New Zealand, and to explore the significant risks to people, the economy, the environment, and social fabric. This shows promise as a means of understanding the national system of infrastructure and identifying vulnerable elements, but is still at an early stage.