THE PROVISION AND FUNDING OF FIRE SERVICES

SOME BROADER PERSPECTIVES

NEW ZEALAND BUSINESS ROUNDTABLE

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The New Zealand Business Roundtable (NZBR) is an organisation of chief executives of major New Zealand businesses. Its activities include the publication of research studies on issues of national interest. Published material is available on a subscription basis and individual publications can be purchased from the NZBR office.

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CONTENTS

EXECUTIVE SUMMARY

- The provision and funding of fire services should be viewed in a broad context. The aim of policy should be to achieve optimal levels of investment in fire prevention, loss minimisation, insurance and fire services.

- Incentives for optimal investment in the prevention of fires and the minimisation of deaths and injuries from fires are impaired by the Accident Rehabilitation and Compensation Insurance Corporation scheme, the public funding of most health care and statutory constraints on the ability of property owners to recover losses arising from accidental fires that spread from other properties.

- Beyond the establishment of a minimum code aimed at promoting the safety of the public, economic grounds for government action affecting the prevention of fire, fire losses, fire insurance and fire services are not compelling.

- There is no persuasive case for public provision or funding of fire services. From an economic perspective, fire services are essentially private rather than public services.

- The critical feature of fire services, which may justify government action, is a perceived free-rider problem. This problem arises where the community is not prepared to withhold fire services from people who refuse to pay. Government action to enable providers of fire services to receive payment for their services may be required.

- The introduction of competition for the supply of fire services, especially for services provided by career firefighters, is vital for the promotion of economically efficient fire services.

- The present levy scheme is a relatively inefficient method of financing fire services because the costs imposed on individuals and firms do not reflect:

  - the quality of service provided to each property owner;

  - fire risks pertaining to the particular property; and

  - the extent to which fire services are used by the property owner.

  Prices charged for fire services should reflect these factors.

- Fire services should generally be provided on a competitive basis with providers having the right to enter the market provided that minimum standards are met.

- Existing fire services should be reorganised, as far as possible, on a competitively neutral basis.

- Firms should be permitted to provide their own fire services, provided that they meet minimum standards set by the government.

- In rural areas, where fire services are modest and are provided by volunteers, territorial authorities should continue to be able to arrange for the provision of fire services.

- Property owners should generally be obliged to subscribe for the fire service of their choice. The government should assist by providing mechanisms to enable fire services to collect subscriptions and user charges.

- If competitive fire services are not permitted, the next best option would be to allow the supply of fire services to be organised by territorial local authorities with the right to supply such services put out for tender on a regular basis.

- If neither of these approaches is accepted by the government, steps should be taken to improve the economic efficiency of fire services and to reduce their costs. There is considerable scope to reduce costs without endangering lives or property.

- The government should aim to reduce the real cost of fire services over the five years to 1999/2000 by between 30 and 40 percent of the New Zealand Fire Service Commission's 1993/94 budget. This would provide a real cost saving to the community of between $50 and $70 million, about double that proposed by the chief executive of the fire service.

- The proposals contained in this report would advance efficiency by promoting a better allocation of resources among fire prevention, loss minimisation, insurance and fire services. Replacing the existing levy scheme with a market-based pricing system as proposed would also be a more equitable approach. Prices could be expected to reflect the quality of services available to each property owner, fire risks involved, and the use that is made of fire services.

1 INTRODUCTION

The provision and funding of fire services affects every household and firm. Most fire services are currently provided collectively on a national basis. They are largely funded by a levy on insurance firms in respect of contracts that provide fire cover. The levy is passed on to households and firms that buy fire insurance.

While direct spending on fire services totalled around $170 million in 1993/94, substantial additional resources would have been allocated to fire prevention and to reducing death, injury and property losses from fires. Because of the size and significance of these activities, it is important for community welfare that individuals and firms are encouraged to make optimal investments in loss prevention and minimisation, insurance and fire services. It is within this broad context that the provision and funding of fire services is reviewed in this report.

There is a continual need to examine public sector activities to ensure that the resources committed to them are used to best effect. If public sector producers use resources inefficiently, national output and incomes will be reduced. Public sector activity may, for instance, replace private sector activity that would yield a better return to the community. Conversely, if inadequate resources are devoted to public sector activities, community welfare will be impaired.

The conditions necessary for the efficient production of goods and services by public enterprises are better understood now than when the present structure of fire services was put in place in the mid-1970s. This is a further reason for reviewing whether the current structures are appropriate for today's requirements.

This report has been prepared from a community-wide rather than a sectional perspective. While some commentators have suggested that the New Zealand Business Roundtable's interest in the provision of fire services is motivated by self-interest, this is not the case. The NZBR has examined a wide range of public policies with a view to promoting reforms that will raise the general welfare of the community.

The balance of this report is presented in 7 sections. The next section (section 2) summarises the development of fire services in New Zealand from early European settlement. The discussion focuses on the provision and funding of fire services. The findings of the 1993/94 internal review of fire services are summarised. The public policy framework is then discussed (section 3). The role of the government, impediments to efficient spending on loss prevention and risk sharing, and the grounds for government provision and funding of fire services are examined.

In section 4 options for the provision of fire services that permit greater competition in the supply of fire services are evaluated. This is followed by an evaluation of existing funding arrangements and proposals aimed at their improvement (section 5). Sections 4 and 5 present long-term proposals for reform. In contrast, section 6 examines the scope for improving the efficiency of the New Zealand Fire Service Commission within the context of the existing institutional structure. The conclusions of the investigation are summarised in section 7.

2 DEVELOPMENT, ORGANISATION AND FUNDING OF FIRE SERVICES

2.1 A BRIEF HISTORY OF NEW ZEALAND FIRE SERVICES[1]

Uncontrolled fire was a hazard faced by New Zealand's earliest inhabitants.[2] As settlements developed, the risk of death, injury and property losses from fire increased. Early commercial and domestic buildings were small wooden structures often thatched with raupo. Fire could easily destroy entire blocks of such buildings. As early as the mid-1840s, the use of raupo as a building material in Wellington was prohibited, possibly the first New Zealand regulation aimed at reducing the risk of loss of life and property from fire. Other centres followed suit or taxed the use of raupo "out of existence" (McLean (1992)). In 1856 the City of Auckland Building Act prohibited the construction of timber buildings in the central business district.

Fire protection was the responsibility of individual property owners. In the main centres, firefighting was in the hands of fire insurance companies, militia, police and civilian volunteers. In the 1840s volunteer fire brigades, which had little official standing, were formed in the main towns. They were usually equipped and sometimes controlled by fire insurance companies, though their equipment was rudimentary by today's standards. An insurance company-funded fire brigade was established in Auckland in 1848 (McLean (1992)).[3] Some fire brigades only attended fires that affected properties insured by companies which controlled the fire brigade. The Wellington Provincial Council stationed a manual fire appliance at Thorndon under police control in 1858.[4]

The Auckland provincial government passed a by-law in 1854 authorising a levy on the owners of domestic and commercial property who could benefit from fire protection in Auckland city. The purpose of the levy was to help defray the costs of Auckland's volunteer fire brigade. The brigade's performance was criticised following a fire in 1858 that destroyed the central business district and it was disbanded. Before the 1860s some volunteer brigades were reported to be funded on a subscription basis (McLean (1992)).

During the 1860s volunteer fire brigades in the main centres came under greater municipal control. Christchurch (1860), Dunedin (1861) and Auckland (1865) formed such brigades. Auckland City also assumed control of its insurance funded brigade in 1874 but the insurance companies agreed to continue contributing to its cost. In 1862

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1 The summary presented in this section is largely drawn from the following sources: Department of Statistics (1990); Gillon (1985); Hensley (1989); Hunn (1982); McLean (1992); and McLintock (1966). These sources conflict on some points. The purpose of the summary is to present a general overview rather than a precise historical account.

2 McLean (1992) describes New Zealand as "a land of fire". He reports research which suggests that huge fires devastated many parts of New Zealand about 2,500 to 1,500 years ago. McLean also discusses the use of fire by early Polynesian inhabitants.

3 Simmonds (1989) notes that fire insurance companies began to be established in Britain in the 1680s and that right from the start the companies linked fire insurance with the provision of a firefighting force.

4 The New Zealand Constitution Act 1852 established six provinces with responsibility for local government. Provinces were abolished in 1876. The Municipal Corporations Act 1867 was the first comprehensive legislation relating to local government.

Dunedin appointed a fire superintendent who was possibly the first paid firefighter in the country (Department of Statistics (1990)). The four main centres had a "smattering of permanent firefighters by the 1880s" (McLean (1992)).

Spats between competing fire brigades and the burning of uninsured buildings led to the establishment of municipal fire brigades (McLean (1992)). The transition to municipal-controlled brigades was not a smooth one. Protracted and sometimes acrimonious disputes over the funding of fire services occurred among local authorities, insurance companies and central government. The effectiveness of early brigades was often ridiculed and it was not uncommon for brigades to cease operations and later to be reformed (McLean (1992)).

One purpose of the Municipal Corporations Act 1876 was to put firefighting on a more organised basis. Local authorities were authorised to facilitate fire prevention, to appoint fire inspectors and to establish fire brigades.[5] Permanent, paid fire brigades were established in place of the largely volunteer brigades in Christchurch (1868), Wellington (1882) and Dunedin (1885). By 1892 67 fire brigades had been established with a total strength of over 200 officers and 1,200 men (Department of Statistics (1990)). The reticulation of water in urban areas toward the end of last century, which was a local government function, improved the effectiveness of firefighting. The first fire sprinkler system was installed in 1889.[6]

The next major change in the organisation of fire services was instigated by the Fire Brigades Act 1906. The purpose of the Act was to make better provision for the protection of life and property from fire. It was the first Act entirely devoted to fire protection. The Act provided for the establishment of fire districts and fire boards in larger towns. The cities of Auckland, Wellington, Christchurch and Dunedin were declared to be fire districts. On application from a local authority, other parts of New Zealand could be declared to be a fire district by the governor in council.

Every existing fire brigade in a fire district was brought under the control of the fire board and the brigade's assets were generally vested in the fire board. Fire boards comprised one member appointed by the governor, three members elected by insurance companies and three members elected by the relevant local authority. For the first time fire services were part-funded by central government. The government's contribution was determined by reference to the amount that it would have contributed if its property were subject to rates. The balance of funding was divided equally between companies that insured property within the fire district and the local authority.

Fires at the Seacliff Mental Hospital near Dunedin (1941) and at Ballantyne's department store in Christchurch (1947) claimed 37 and 41 lives respectively. Measured in terms of the loss of life, these were New Zealand's worst fires. Following the Seacliff fire, sprinkler systems were installed in public hospitals. A royal commission which enquired into the Ballantyne fire severely criticised the effectiveness of fire services and safety standards. The royal commission found that the city's safety regulations had not been complied with and that the building was unsafe even though the Factories Act had not been breached. The building had been inspected and passed by the Department of Labour in 1943. The performance of the store's staff was also criticised (McLean (1992)).

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5 Limited fire prevention measures were included in the model by-laws provided in the Municipal Corporations Act 1867. In Britain, local government was not given a statutory duty to maintain fire brigades until 1938. The burden of firefighting had fallen on insurance companies. From 1865 to 1938 this role had progressively been assumed by local government (Simmonds (1989)).

6 Strategos Consulting Limited and M & M Protection Consultants (1989), cited below as Strategos (1989).

The Fire Services Act 1949, which was passed in response to the royal commission's report and to earlier efforts to improve the finances of smaller fire boards, established a Fire Service Council with the objective of standardising fire services throughout the country. The Fire Service Council comprised representatives of the government, the New Zealand Fire Underwriters' Association, fire service employer and employee organisations and the United Fire Brigades Association. There was provision for the Secretary of Internal Affairs to attend meetings of the Council.

The specific duties of the Fire Service Council included the following:

- to ensure that every urban fire authority conformed with the Act and maintained an efficient fire service. The Council prepared a code of practice to guide urban fire authorities which provided for risk classification within districts and standards for fire protection;
- to coordinate the units of the fire service for the purposes of rural fire protection, reinforcement at serious fires, or for war or other emergencies;
- to encourage, supervise or carry out fire prevention activities;
- to establish a training school and course of training for firefighters;
- to classify fire districts;
- to classify the positions of permanent officers and to facilitate inter-brigade promotions;
- to approve the appointment of permanent executive officers proposed by urban fire authorities; and
- to approve and determine estimates of expenditure for urban fire authorities.

The last chairman of the Council and the first chairman of its successor commented that:

> To co-ordinate fully ... it is necessary to have control, whereas the brigades were controlled by local boards and committees, not by the Council. Nevertheless, the Council was effective in important areas and developed a good system of fire defence. Its influence was exerted by approving (or disapproving) the annual estimates, brigade complements, new stations and appliances.[7]

Measured against a contemporary view that public sector agencies should have clear objectives, unambiguous lines of authority and be held accountable for their decisions, it is not surprising that the administration of fire services by the Council and fire boards was re-examined.

A further tragedy in 1969 led to mandatory fire safety requirements and to the creation of the fire inspectorate. Seven elderly people died in a fire at the Sprott House rest home in Wellington. The resulting committee of inquiry focused on fire safety in relation to buildings which, because of the special nature of their occupancy or because of the mental or physical incapacity, age or health of their occupants, required special provision (Hunn *et al.* (1970)). The committee reported that there was "a clear expression of public opinion that fire safety legislation and procedures stand in need of further improvement." It concluded that "co-ordination between local

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7 Hunn (1982).

authorities, licensing authorities and fire authorities was not nearly as good as it ought to be." [8]

The committee's recommendations were intended to achieve the following objectives:

- to clarify the legislative standards of fire protection and to make their interpretation unambiguous;
- to assign clearly defined responsibilities to the authorities involved;
- to require annual licensing and fire inspection of all classes of buildings which were included within the inquiry. Fire safety standards were to be upgraded;
- to establish a national fire safety inspectorate to prescribe uniform rulings and procedures and to coordinate their implementation; and
- to bind the Crown to comply with fire safety legislation.

While the committee's report described in detail fire safety requirements applicable to most public buildings, it contained little discussion of economic issues related to fire protection and its recommendations. There was, for example, no attempt to assess, even in qualitative terms, the costs and benefits of its proposals.

The organisation of local fire services, which was established in 1906, largely remained in place until April 1976 when the present structure came into effect (see below). The Fire Service Council survived until the mid-1970s and local government contributed to the costs of urban fire services until April 1976. The present funding of fire services, by a levy on insurance companies, can be traced to the 1906 Act and to the establishment of early fire brigades by insurance companies.

Rural Fire Services

This brief summary of the development of fire services up to 1976 largely relates to urban fire services. Rural fire services focused initially on the protection of forests. The New Zealand State Forest Act 1885 authorised the requisition of men for fighting fires in state forests while the Forests Acts 1921 and 1922 restricted the lighting of fires in such forests. The Counties Act of 1903 authorised private property owners to establish fire brigades and to appoint fire inspectors.

The Forest and Rural Fires Act 1947 aimed to protect vegetation other than state forests. Three classes of fire authorities could be set up under the Act: county; soil conservation; and rural fire districts. Within its area, the authority could take appropriate measures to prevent fires and to protect trees and other vegetation. All rural fire legislation was brought together and the classes of fire authorities were extended in 1955.

A review of rural fire services was undertaken by officials and a member of the New Zealand Fire Service Commission (the Commission) in 1989 (see Hensley *et al.* (1989)). The review noted that rural fire protection had been underwritten by the New Zealand Forest Service (Forest Service). The Forest Service had a large workforce located throughout New Zealand that was trained in firefighting. Whenever a fire occurred, whether on Crown or private land, the Forest Service responded if it had resources available and was within a reasonable distance. The Forest Service set standards for

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8 Many of the regulatory authorities referred to had been set up for reasons other than the promotion of fire safety (for instance, control of the sale of liquor).

rural fire equipment that were followed by the New Zealand Defence Force, the New Zealand Fire Service and by private forest owners.

In 1987 the New Zealand Forestry Corporation was formed to manage the Crown's commercial forests in a more business-like manner. Not surprisingly, the New Zealand Forestry Corporation was not prepared to assume the rural fire protection role that had been performed by the Forest Service. The Department of Conservation assumed responsibility for indigenous forests and national parks and the Ministry of Forestry became responsible for the administration of the Forest and Rural Fires Act. These changes led to the review of rural fire services by Hensley *et al.* (1989).

The review recommended that:

- rural fire services be organised on a local government basis rather than a national command structure because they were of a local and territorial nature;
- services be delivered through rural fire authorities that were to be coordinated at a regional level;
- a national rural fire authority be set up with the following functions:
  - to establish national standards;
  - to audit their application;
  - to administer the rural firefighting fund;
  - to organise national training; and
  - to promote rural fire prevention campaigns;
- the Fire Service Commission be designated the national rural fire authority; and
- rural fire organisations should be responsible for their routine costs and extraordinary costs should be met from an expanded rural firefighting fund. It rejected the suggestion that rural property owners were subsidising urban fire services through the levy scheme.

Under the Forest and Rural Fires Act 1977, the fire authority is generally one of the following:

- the rural fire committee for the relevant gazetted rural fire district. There are 34 rural fire districts (including 6 defence rural fire districts) covering about 2 million hectares. They include most large commercial forests and in particular the New Zealand Forestry Corporation. The Corporation has responsibility for fire protection for commercial forests grown on Crown land which are deemed to constitute a rural fire district. The Corporation and the New Zealand Defence Force have entered into a mutual aid arrangement. The minister of defence is generally the rural fire authority for defence rural fire districts;
- the minister of conservation. The minister of conservation has responsibility for fire protection for national parks, scenic reserves and similar publicly owned land. The minister's responsibility extends to about one-third (7.5 million hectares) of New Zealand's land area; and
- the territorial authority with jurisdiction for the affected area. Territorial authorities are the rural fire authorities for land other than that included in an urban or rural fire district and land managed by the Department of

Conservation. They include 58 district councils, 14 city councils and 1 county council.

About 88 percent of New Zealand's land area falls within the jurisdiction of rural fire authorities but most people reside within urban fire districts. Most property, other than land, is located within urban fire districts.

From 1954 urban fire services were required to attend all property fires within 5 road miles of a fire station even if the fire occurred outside the relevant fire district. The costs of fighting such fires were recoverable from the rural fire authority (McLintock (1966)). Urban fire services often assisted in other circumstances but their equipment was not generally suited to fighting rural fires (Hensley *et al.* (1989)).

Rural fire services were funded by vote appropriation in the case of government agencies (New Zealand Defence Force and the Department of Conservation), self-funded by commercial forest owners (except for fires that start outside such forests) and funded by ratepayers in the case of local authorities.[9] In both 1991/92 and 1992/93 $0.5 million of levy income was transferred to the rural firefighting fund but no transfer was made in 1993/94 when grants from the fund amounted to $1.1 million. In June 1994 the fund amounted to $2.5 million.

2.2 PROVISION AND FUNDING OF FIRE SERVICES TODAY

There has been a gradual trend toward public provision of urban fire services and greater centralisation and standardisation of all fire services at least since the 1860s. This trend was accelerated by the Fire Service Act 1975 and by a subsequent amendment that brought rural fire services under the oversight of the Commission from 1 July 1990.[10] The Act provided for the establishment of the Fire Service Commission to administer a nation-wide fire service.[11] Fire Boards were abolished and their assets were transferred to the Fire Service Commission.

Unlike most previous reforms the nationalisation of fire services was not precipitated by a tragic event involving fire. McLean (1992), apparently drawing on Hunn (1982), identified a number of factors that contributed to the establishment of the Fire Service Commission. The minister of internal affairs at the time (Hon Henry May) "shared many of the firefighters' reservations about the local efficiency of the government/insurance company-controlled brigades." The minister had been encouraged to nationalise by the chief inspector of fire brigades in Britain. Difficulties encountered in coordinating independently-controlled fire brigades during the Parnell fumes emergency in 1973 were cited in support of unified control of fire services on a command basis. There was also a partial strike in 1974 in which the firefighters' union claimed that a government commitment to nationalise the fire service would be required for the resumption of normal work.

One of the main aims of the integration of urban fire services was the removal of what was seen as the fire service's greatest problem - "divided control spread unevenly over 277 fire districts administered by almost as many diverse local authorities, fire boards,

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9 Forest owners are not subject to the insurance-based levy. The New Zealand Fire Service is authorised to recover the costs of fighting forest fires within urban fire districts from the forest owner.

10 The New Zealand Fire Service Commission succeeded the Fire Service Commission in 1990.

11 The former Fire Service Council was replaced in August 1974 by a three person Fire Service Commission which was charged with preparing a plan to merge local fire brigades into a national fire service.

and fire committees" (Department of Statistics (1980)). The Fire Service Commission's organisation structure contained four levels comprising the following:

- the Fire Service Commission;
- six administrative regions;
- 22 operational areas or groups based on the emergency toll (111) zones; and
- 277 fire districts (Hunn (1982)).

The retention of the existing fire districts was consistent with the decision of the Fire Service Commission that the brigades were to retain their local allegiances and responsibilities.

In the mid 1970s it was widely believed that considerable additional expenditure would be required to upgrade buildings and equipment, especially fire appliances, and to improve administration and training (Mark (1983)). Furthermore, Mark, a retired chief executive of an insurance company, reported that:

> The Fire Service Commission ... found itself engaged very early in a series of industrial negotiations the outcome of which was critical as far as the fire service's financial future was concerned. The remuneration and conditions of service of fire service personnel was settled on very generous terms and the fire service ... found itself locked into a situation where staff and staff related expenses were substantial, difficult to control, and would inevitably escalate.

The Act reduced the direct influence on the management and control of urban fire services of interests such as insurance firms, ratepayers and property owners that were most affected by the costs and effectiveness of fire services. While provision was made for annual consultations between the Fire Service Commission and insurance interests on its planned expenditure, Mark (1983) concluded these had proved to be inadequate to control costs.

The Fire Service Commission was restructured in 1990 to improve its effectiveness and the efficiency of its management. The Commission, as re-established, comprises three independent members and the Secretary for Internal Affairs.[12] The independent members are appointed by the governor-general on the recommendation of the minister of internal affairs. The minister is required to have regard to the personal attributes of potential appointees and to the need for appointed members to have between them experience in public administration, business and economic management, and finance. In addition, at least one member is required to be experienced in fire engineering or senior operational firefighting. Unlike its predecessor, the Commission did not include the commander of the fire service. The Commission is required to comply with all written directives given by the minister with respect to government policy. It is understood that no such directives have been issued.[13]

The Commission has general control over the New Zealand Fire Service (NZFS). It is required to appoint the chief executive and the national commander of the NZFS. The first chief executive was also appointed national commander but the positions are

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12 The New Zealand Fire Service Commission, defined earlier as the Commission, replaced the Fire Service Commission.

13 There is some indication in recent Cabinet papers that the application of this provision was contemplated or used to help ensure that cost savings arising from the 1993/94 internal review of fire services are realised.

currently held by separate appointees. The NZFS is responsible for the promotion of fire safety, the prevention, suppression and extinction of fires, and the safety of persons and property endangered by fire in every urban fire district.

In addition to these responsibilities, the NZFS provides certain special services (for example the rescue of people from motor vehicles, cliffs and collapsed trenches, and rendering safe spills of hazardous materials) which are not necessarily associated with fire or potential fire. Special services have grown faster than traditional fire services. They account for about 16 percent of all incidents attended. The Commission allocated $31.7 million (19 percent) of its chargeable costs to non-fire emergencies in 1993/94.[14] The NZFS is under a statutory obligation to endeavour to extinguish and prevent the spread of fire and to save lives and endangered property from fire in an urban fire district. In contrast, the NZFS is only required to attend other emergencies, including those involving hazardous substances, if the chief fire officer considers that it could render assistance.

The Commission has been designated the National Rural Fire Authority for the purposes of the Forest and Rural Fires Act 1977. In this role, the Commission carries out the following tasks:

- advises the minister;
- consults with national organisations;
- coordinates rural fire control;
- produces and audits the rural fire management code of practice;
- coordinates fire weather predictions;
- promotes research into rural fire matters;
- promotes training in rural fire control;
- makes grants to rural fire authorities; and
- facilitates regional approval of fire plans.

Rural fire authorities remain the same as those described above.

The organisation of fire services in 1994 (before the implementation of changes arising from the 1993/94 review) is summarised in Figure 2.1.

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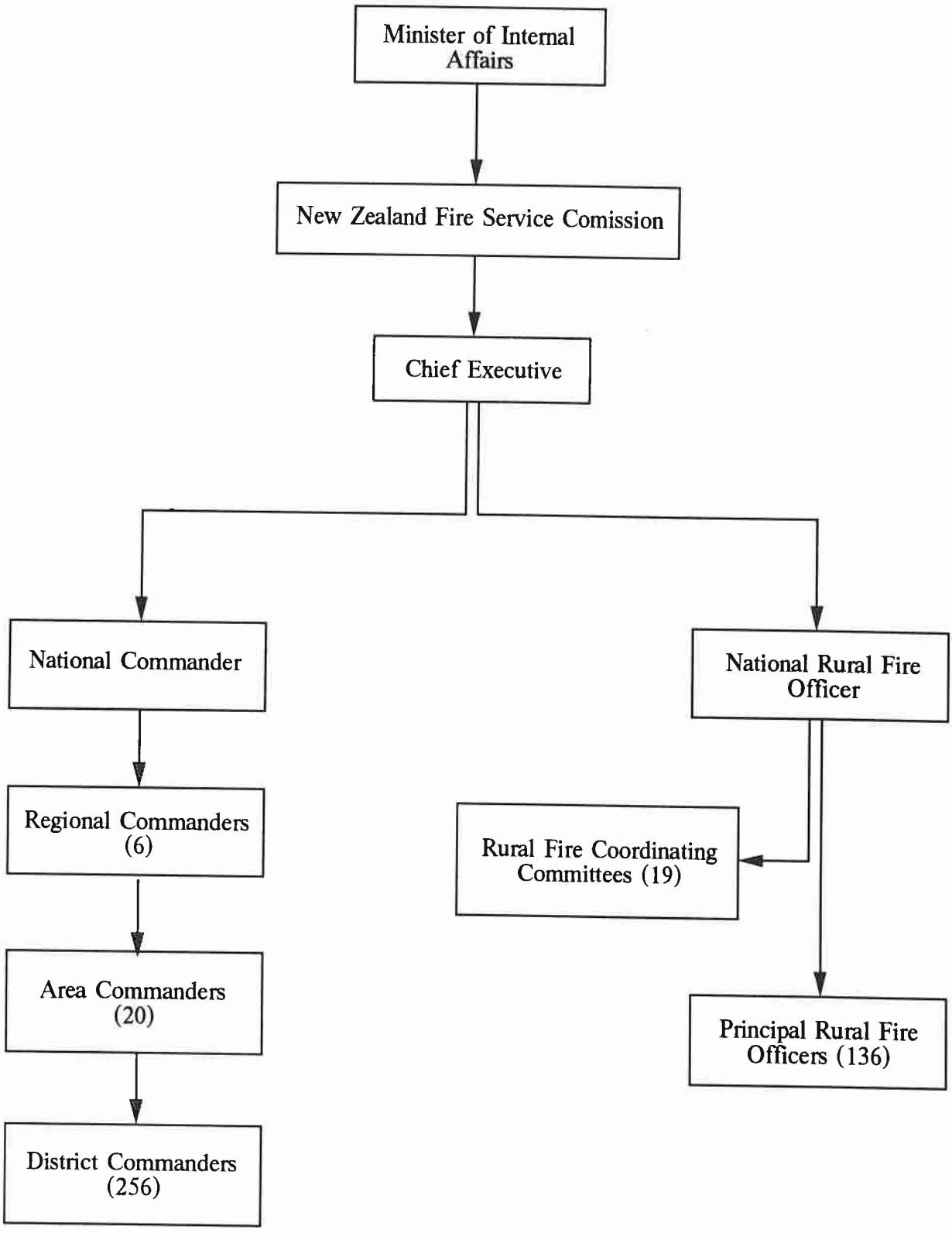
14 The allocation to urban fire protection has fallen from $173.8 million in 1991/92 to $112.5 million in 1993/94. The main reason for this decline has been a reallocation of costs among output classes rather than a substantial change in the priorities of the Commission. The reallocation occurred at a time when the Commission's expenditure came under closer scrutiny. The allocation of costs to non-fire emergencies appears to be artificial. The main non-fire emergency activity which is costly is hazardous substance emergencies. The allocation is, however, inconsistent with charges for the costs of hazardous substance emergencies. The number of non-fire emergencies attended is not a good indicator of the cost involved because, as the Commission argues, the marginal costs of attending such incidents is low.

FIGURE 2.1
ORGANISATION OF FIRE SERVICES



Source: New Zealand Fire Service

In 19 urban fire districts, which include cities and larger towns, the NZFS employs career firefighters who are supported in some cases by volunteers. In the remaining 246 fire districts, volunteer brigades, registered under the Fire Service Act 1975, provide fire protection. In addition, there are 20 industrial fire brigades, at major industrial sites, which are registered with the Commission. Some firms may maintain fire services that are not registered with the Commission. Registered fire brigades are required to comply with standards set by the Commission. There are also 58 auxiliary fire brigade units registered with the Commission that provide services outside urban fire districts.[15]

Funding of Fire Services

Under the Fire Service Act, the Commission is required to be paid such income as is necessary to meet the actual net expenditure of the Commission. In 1976 the government met around 25 percent of the fire services' costs. The government now meets 8 percent of the estimated annual expenditure of the Commission, net of any adjustment for the difference between actual and estimated expenditure in the previous year. This contribution is intended to reflect the government's share of the Commission's costs, for instance those associated with uninsured property, including government property.

The balance of the Commission's expenditure is financed by a levy (the levy) on firms that insure real or personal property for loss from fire under any contract of insurance.[16] Between 1976 and 1986 the levy applied to fire insurance premiums. However, the difficulty of identifying fire premiums in relation to insurance policies that provided cover for more than one contingency led to the present levy system.

The levy is authorised by the Fire Service Act 1975. Insurance companies are empowered to collect the levy from policy-holders. The levy is generally payable on the amount for which the property is insured up to its indemnity value. The current rate of the levy (applicable from 1 May 1993) is 0.062 percent. The rate of levy is set by order-in-council. The levy has increased from 0.020 percent before June 1982 to the present level. The Commission's chargeable expenditure in 1993/94 amounted to $170 million or almost $50 a person.

Mark (1983) commented that:

> If a single philosophical principle underlies ... [the history of funding urban fire services in New Zealand] it is that the provision of fire services should be subject to the so-called "user-pays" principle, and that this particular public service should be charged upon those who benefit from it.

The same comment could be made in respect of rural fire services. These observations relate to the funding of fire services on the basis of the levy and rates rather than direct user charges which account for a little over 1 percent of the Commission's funding.

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15 The NZBR is unaware of any information on the extent of fire services provided other than under the Fire Service and Forest and Rural Fires Acts.

16 A number of commentators on an earlier draft of this report suggested that the levy is imposed directly on policy-holders. The Fire Service Act states that "every insurance company with which any property is insured against fire under any contract of fire insurance ... shall pay a levy to the Commission." It also states that the levy is a "debt due by the insurance company to the Commission." Insurance companies are, however, empowered to recover the levy from the insured. Note that the term insurance company is very broadly defined and includes entities that are not registered as companies. Special provisions apply to enable the levy to be collected where the insurer does not carry on business in New Zealand.

In 1990 the Commission was authorised to charge for services provided other than for services that relate to the specific responsibilities of the national commander. The latter may be summarised as follows:

- the prevention, suppression and extinction of fires in urban fire districts;
- the safety of persons and property endangered by fire in an urban fire district;
- the maintenance of the NZFS in a state of operational efficiency; and
- the promotion of cooperation between all fire services and among the NZFS and local authorities.

The Commission has explicit power to charge for the following services:

- attendance at a hazardous substance emergency, whether there is an actual or suspected fire;
- fire safety activities;
- firefighting involving a commercial forest in fire districts or areas which the Commission and a territorial local authority in a rural area have agreed will be protected by the Commission;
- attendance at marine fires; and
- attendance at a false alarm of fire where the alarm came from persons or equipment in any premises.

Where a charge is made for attendance at a hazardous substance emergency, the NZFS is required to include all costs incurred.

The general policy of the Commission is to charge for services in the following circumstances:

- attendance beyond the first hour at either vegetation fires in rural fire districts or fires in commercial forests. The attendance of the NZFS at such fires beyond the first hour is generally subject to the agreement of the rural fire authority and property owner respectively. No charge is made for attendance of the NZFS at rural fires that affect property of a class which is subject to the levy;
- attendance beyond the first hour at hazardous substance emergencies (not involving fire). The costs of external help, repairing damage to equipment and materials used are charged to the property owner. The agreement of the owner or other authorities that the NZFS is required beyond the first hour is generally sought;
- fires involving hazardous substances if the presence of any hazardous substances hinders or impedes firefighting or damages equipment. Contract help, any damage to equipment and materials used are charged to the owner;
- false alarms caused by defective equipment, or careless or deliberate acts. After the first two calls within a 6 month period, the owner is warned that any further calls within the next 12 months will result in costs being charged;
- certain special fire safety inspection services provided by agreement with territorial authorities; and

- formal fire safety training.

The Commission is authorised to make grants to rural fire authorities from the rural firefighting fund. Grants are provided for the costs of control, restriction, suppression or extinction of fires (except where the fire originated in a defence area or a commercial forest) and provided that various conditions are met. The exception in respect of commercial forestry arises because the affected property owners are exempt from the levy. Besides this provision, the costs of rural fire services fall on the relevant fire authority. The minister of internal affairs determines the amount of the levy and the government contribution that is to be transferred to the fund. The Department of Conservation makes an annual grant to the fund.

The rural firefighting fund meets 95 percent of the costs of all major fires (those costing more than $5,000) and minor fires (over $1,000) which may be accumulated into a major fire, fought by rural fire authorities. Grants toward the costs of firefighting equipment are also made on a dollar for dollar basis.

Where possible, the costs of extinguishing rural fires are charged to the person responsible for the fire. A rural fire authority is generally permitted to impose a levy on any land owner in a rural fire district. A levy may also be imposed on land owners generally or on any land owner who was menaced by a fire to recover the costs of fighting a fire in rural fire districts (other than in a state area). However, costs that are not recovered from the person responsible for the fire or from the rural firefighting fund are normally financed through rates. Insured property that is protected by rural fire authorities is generally subject to the levy.

2.3 THE 1993/94 INTERNAL REVIEW

In August 1993, the government examined whether an external review of the fire service should be undertaken. The government decided that the chief executive of the fire service should be permitted to conduct an internal review and to defer further consideration of an external review for the meantime. The internal review involved three separate investigations and reports:

- an independent review by three consultants;
- an internal review by two members of the NZFS; and
- the chief executive's review and recommendations.

Findings of the Independent Review Team

An independent review team was established by the chief executive to investigate and report on changes to organisational structures, management systems, policies, procedures and resources required to improve the economy and efficiency of fire protection and related emergency services.[17] The independent team's report provided a comprehensive and persuasive analysis of the management of the NZFS.

The independent review team assessed the performance of the NZFS since its nationalisation in 1976. The team's findings included the following:

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17 McCaw *et al.* (1993).

- the costs of operating the fire service had risen since nationalisation. Much of the increase was explained by real increases in remuneration;

- the total value of property protected by the NZFS had increased at a faster rate than the cost of the service;

- in terms of total calls there had been little change in demands placed on the NZFS but the number of emergency incidents attended had fallen over the past seven years. As a consequence, there had been a marked increase in the cost per incident attended;

- the quality of the service provided had improved;

- there were substantial regional variations in the efficiency with which fire cover is provided; and

- New Zealand's standards of cover and cost of fire protection appeared to be on a par with those of other developed countries.

The team identified a number of serious weaknesses in the management of the NZFS. These included the following:

- a lack of clarity as to the core business of the NZFS. There is confusion over whether the core business of the NZFS is fire fighting or fire prevention and safety;

- a dysfunctional organisational structure. This was evident from an unclear differentiation of the roles of the Commission and the chief executive, over-centralisation of authority, fragmented and overlapping responsibilities between directorates within headquarters and "clogged control and communication lines" between different parts of the organisation;

- regional frustrations with what were perceived to be arbitrary and misguided decisions by headquarters;

- a lack of policy formulation arising from confusion as to the responsibilities of the Commission and the chief executive;

- a lack of systematic planning and allocation of resources aimed at achieving strategic outputs, inadequate analysis to support decision making, unclear measures of operational effectiveness and the absence of a strategic approach to the management of human resources;

- services were supply-driven rather than based on customer demands and community needs;

- inadequate financial controls and reports; and

- high cost staffing. The current shift system, crew sizes and staffing ratios, as well as general staff pay and conditions, were found to be a heavy financial burden for the NZFS. The effectiveness of the reward system and the rationale for the current staffing system were unclear.

The team concluded that the nationalisation of the management of the NZFS had been "ineffective". Management had become "a bureaucracy imposed on top of disparate fire services and has fallen short of the truly nation-wide integrated service envisaged". On the other hand, the team found:

> At the base of all fire services reviewed ... effective fire suppression and other emergency management, and adequate, if less effective, fire prevention and safety promotion.

The team argued that fundamental reform rather than piecemeal change was necessary to overcome the deficiencies identified. It made fourteen broad recommendations. A key element of the team's recommendations was a substantial change in the organisation and management of fire services. The Commission would be expanded into a policy and purchasing agency and would be supported by a small advisory staff. Fire services would be provided by three separate regional fire business enterprises. This structure, which was based on a clear separation of purchase and service delivery functions, is similar to that adopted for the delivery of health services. The financial management and reporting provisions affecting fire services would be brought into conformity with the requirements of the Public Finance Act 1989.

A comprehensive human resources strategy was required to reverse the escalating cost of the fire service, to improve productivity and to address the age structure of the service. A new three-watch roster system was proposed for career firefighters based on a 56 hour week rather than the existing 42 hour week.

The team's recommendations were estimated to save $29 million a year or 17 percent of current costs once fully implemented, $25 million of which would arise from reduced staff costs. Staff would be reduced by 560 (net), including 340 operational staff. The balance of net staff reductions would affect national and regional headquarters, non-uniform staff in areas and districts, and control-room staff.

Findings of the Internal Review Team

The second element of the chief executive's review comprised an examination by an internal review team lead by Senior Fire Commander Geoff Summers, the fire service's director of personnel, and National Rural Fire Officer Murray Dudfield.[18] This team was directed to review the organisational structures, management systems, current policies and practices, and resources affecting the provision of fire protection and related emergency services, and to identify any improvements in economy and efficiency of operation that could be made. Particular attention was to be given to the roles of the Commission and the chief executive, the command structure and associated personnel establishments, the pay and conditions of service of firefighters, accountability for operational effectiveness and expenditure and to the allocation of resources.

The internal review team consulted widely with staff. Operational staff suggested that the management structure above station level was top heavy with too many regions, that it was too large and that it inhibited performance and change. Resources were reported to be ineffectively deployed, funding was erratic and political, and the supply and purchasing process was inefficient. While NZFS operations were described as highly capable there were a "multitude of opportunities" for improvement. Front line capabilities were described as superb. There was, however, a lack of regard for some middle, and many senior, managers. Poor performance at all levels was reported to be tolerated. Operational staff expressed a desire for greater responsibility and accountability.

Fire safety personnel reported that fire safety did not seem to be integrated into the core business of the NZFS. Fire safety initiatives were said to be blocked by management. Volunteer firefighters were reported to be of the view that the top

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18 Summers and Dudfield (1994).

management structure was too heavy and that the service was unable to respond to their special needs. Volunteers were, however, very positive about their role, training and leadership on the ground. Volunteer rural fire forces considered that they did a good job with limited resources. They viewed the NZFS and the national rural fire authority as "bureaucratic".

The internal review team submitted forty-two recommendations. Its conclusions on the organisation structure and management of the NZFS appear to have been developed from a bottom up approach. The team recommended that appliances contain at least a 4 person crew, comprising a crew commander and 3 firefighters but that appliances be built or modified to allow up to 6 firefighters to respond to incidents. Fire districts, each comprising up to 2 stations, would be retained and there would be 11 fire areas with each area to encompass the districts served by one or more complete territorial authorities. This structure was consistent with the review team's conclusion that fire brigades should revert to being community-based. Each area would fall within one of 3 regions, each of which would be headed by a general manager. A slimmed-down national headquarters and a Commission, which would be augmented by a policy unit, completed the proposed structure. The Commission would fulfil the role of purchaser of fire services.

Career firefighters would be employed to crew appliances required for a first-alarm attendance (pump appliances, certain hydraulic elevating platforms, certain turntable ladders and rescue tenders) on a 24 hour basis. In relation to conditions of employment, the team recommended that:

- all NZFS collective employment contracts be renegotiated to conform to modern flexible labour practices. The present agreement for career firefighters is 70 pages long and highly prescriptive;

- all operational firefighting positions of district and division chief fire officer rank and above be employed under individual performance-based contracts;

- collective contracts for firefighters, crew commanders and control room staff be local documents based on the needs of the particular workforce, management and customers;

- firefighters be required to undertake work that needs to be performed while they are on duty. The concept of routine hours would be discontinued;

- career firefighters would work a 56 hour week;

- stations which respond to fewer than 150 calls a year would generally be staffed by volunteers whereas those that receive between 150 and and 300 calls a year would be staffed on a yellow-watch basis. Under this system career firefighters would work from 7.00 a.m. to 5.30 p.m. Monday to Friday with volunteers providing protection for the balance of the week;

- regular cost and benefit studies be undertaken of stations or appliances crewed by career firefighters with low call outs. Stations which have a very low night time call rate, which cover areas where the risk of loss of life in a fire is not high, are able to be staffed using a 2 watch 42 hour week day shift supported by volunteers and off-duty personnel;

- restrictive provisions within the progression clauses of employment contracts, for example preventing employment in administration (black watch) from counting toward time served, be removed; and

- narrow margins between ranks be removed to encourage personnel to seek promotion.

Recommendations of the Chief Executive

The findings of the independent and internal reviews were inputs into the chief executive's report (Cummings (1994)). In contrast to the independent review, the chief executive's report contained little analysis or argumentation. The chief executive accepted that:

- the principles of public sector reform are applicable to the NZFS;
- the government's ownership and purchase interests need to be clearly identified;
- policy advice and service delivery should be contestable to provide performance incentives and to encourage the efficient use of resources; and
- separate agencies should be responsible for policy advice, fire services and regulatory functions.

The chief executive stated that he intended to implement the independent review team's recommendations on human relations and financial management. However, he rejected the team's recommendations on the organisation of the NZFS. The chief executive stated that a national fire service should be retained for the same reasons as those advanced for a national police service and defence force:

> The need to move large numbers of personnel and equipment to any part of New Zealand or elsewhere to deal with a major incident. In the case of the Fire Service such incidents have regularly occurred in the past and involve:
>
> Major bush fires.
> Earthquake rescue and recovery phases.
> Prevention of, and recovery from, flooding.
> Rescue and recovery from tornado or storm.
> Major fume emergencies.

In addition, the chief executive argued that operational procedures need to be reasonably standardised and equipment, training, education, rank structures and communication systems need to be compatible. Furthermore, the chief executive stated that his sources were adamant that the independent team's proposals would result in the destruction of the volunteer system.

The chief executive argued that the role of the NZFS should be extended. It should be given the lead role in rescue (other than police search and rescue) and be required to train and equip itself for that prime role in a disaster situation. The chief executive suggested that the additional role would involve little additional cost. In addition, he raised the possibility of the fire service tendering for the supply of ambulance services.

The chief executive accepted that there were serious deficiencies in the management and structure of the NZFS as evidenced by the following selected observations from his report:

- the core business needs to be defined;
- more emphasis needs to be placed on fire prevention;
- the management structure needs to change to address the core business;
- the relationship between the Commission, the NZFS and the national rural fire authority needs to be clearly defined;

- there is no modern, professional, integrated policy making advice available to either the Commission or the chief executive;
- there is no long-term planning guiding the organisation;
- financial planning and reporting is inadequate;
- there are too many regions, areas, control rooms and ranks; and
- the Crown's expectations in respect of its contribution to the cost of fire services is unknown.

The chief executive's fifty-two recommendations included the following:

- the appointment of a common minister for all emergency services;
- the functions of the NZFS and the national rural fire authority be clearly established through a further examination of the role, funding and legislation affecting the provision of fire protection and other emergency services;
- the Commission to be the funder of fire services with the NZFS responsible for the delivery of services;
- the establishment of 3 relatively autonomous regional management units, each to be headed by a general manager who is to be responsible for administrative management and inter-regional coordination of resources. Authority is to be devolved from national headquarters;
- the establishment of 11 areas within each region with the area commander to be the highest ranking field operational commander. Area commanders are to enter into a purchase agreement with their general managers;
- development of a human resources management strategy and introduction of performance appraisal systems for personnel at all levels;
- individual employment contracts to be negotiated down to division/district commander level;
- a collective agreement, based on entirely new conditions, to be negotiate with firefighters; and
- development of a 5 year strategic plan.

Stage I of the chief executive's plan, which is to be completed by 30 June 1995, focuses on changes to management. The management structure is to be reduced from 13 to 5 levels and the proposed regional and area structure is to be implemented. Some 63 positions are to be disestablished. Stage II focuses on changes to rosters and terms and conditions for career firefighters. It is to be completed by 30 June 1996.

While the chief executive noted that savings in staff and costs would arise, no estimates were provided. Subsequent government papers stated that the Commission estimated that the cost of restructuring would amount to $10 and $20 million in 1994/95 and 1995/96 respectively with savings of $7.7 million in 1995/96 and $28.4 million a year from 1996/97. Officials were unable to verify these estimates. The estimated savings were based on changes to employment conditions together with limited reductions in minimum shift manning and 360 redundancies. Officials commented that there was a high risk that the net savings would not be realised. The maximum net expenditure of the Commission for the 3 years to 1996/97 was

approved by the government, subject to some caveats, on the basis of the Commission's estimated savings.

The Government's Response to the Review

The government examined the findings of the review in April 1994. The initial assessment of officials was that the approach recommended by the independent review team was "very thorough and looks likely to lead to long-term improvements in fire service efficiency." Officials were unable, however, to assess the chief executive's recommendations "vis-a-vis those of the Independent Consultants as his report lacks key information in several areas." Officials were concerned that a wider review of emergency management, as proposed by the chief executive, would be at the expense of attempts to "secure significant and immediate savings in the area of fire protection." The Cabinet agreed that the priority should be to reform the fire service and to realise the projected savings. The Commission was, however, permitted to investigate better coordination between fire services and other emergency services.

The government observed that aspects of the chief executive's review which related to human resource management, terms and conditions of employment, rationalisation of the fire service area structure and some financial arrangements could proceed because they fell within the jurisdiction of the chief executive. For this reason, the government indicated its support for the overall thrust of the report. The government noted that this meant that reform of the fire service would include a separation of funder and provider roles and the establishment of three autonomous regional units responsible for the delivery of fire services. Support for the recommendations of the chief executive was not, however, "without qualification" as specific proposals in each of the reports needed to be evaluated by officials and aspects of the chief executive's recommendations needed clarification. There was also a need to validate redundancy costs and savings and to put in place mechanisms to achieve the savings that were forecast by the chief executive.

The ministers of internal affairs and finance argued that there was no need for an external review of the fire service as earlier recommended, because the chief executive's review drew upon the detailed report by the independent review team. This argument apparently overlooked the fact that a number of interest groups had sought a review of matters which were beyond the chief executive's jurisdiction, such as the levy system. The view of two ministers was noted by Cabinet.

A further Cabinet paper in May 1994, which was signed by the ministers of internal affairs and finance, addressed some aspects of the wider organisation of fire services. The ministers proposed that:

- the fire service levy be treated as tax revenue in the Crown's accounts and that all purchases of fire protection and other emergency outputs be treated as government expenditure and appropriated through vote: Internal Affairs. This proposal was intended to encourage greater scrutiny of the Commission's outputs and inputs by ministers. It was opposed by the Commission;

- one of the following three purchase and provider options be adopted:

  - the Commission to be the minister's purchasing agent, to collect the fire service levy, to appoint the chief executive of the fire service and to monitor his or her performance. This option was recommended by the Commission;

  - the establishment of an independent authority to purchase fire protection and other outputs from the Commission, rural fire authorities and other

providers, to monitor service delivery, to collect the levy and to fund providers. The Commission would become a provider of fire services. This was the preferred option of the Treasury, State Services Commission and Internal Affairs; or

- the Department of Internal Affairs to assume the purchasing role with the Commission to be the provider. This was an alternative recommendation proposed by the three departments;

- appropriate areas for introducing greater contestability, where feasible, be examined as part of the initial purchase agreement (recommended by officials only);

- the fire service remain a single national fire service but with three semi-autonomous regional units;

- the fire service be given the objective of providing the best quality of fire protection and other outputs under its purchase agreement, subject to covering all costs, including the cost of capital; and

- the fire service adopt a normal capital structure and pay a capital charge, based on taxpayers' funds invested, which would be offset by increased funding.

The government was apparently unable or unwilling to decide on these proposals. Instead, Cabinet noted the importance of advancing fire service reforms and of putting in place a durable structure for the purchase and provision of fire services. Cabinet directed that further discussions among ministers and officials should take place. It seems that such discussions failed to resolve the issue. In addition, the minister of internal affairs began consulting groups on a wider review of emergency management which could affect the long-term structure of the fire services.

In September 1994, the ministers of internal affairs and finance proposed that examination of the organisation of the fire services should be deferred until 31 May 1995 at the latest, and that the existing relationship between the Commission and the NZFS should remain unchanged in the meantime. Prior to 31 May 1995, a review of the Commission's performance in meeting its targets would be undertaken. A two person advisory board was appointed to advise the Commission and chief executive, and to monitor and report to ministers on the Commission's and the NZFS's performance in achieving expected savings.

The Commission was required to develop a purchase agreement with the chief executive which is to apply from 1 July 1995. The agreement is to specify all fire protection and other outputs to be delivered, together with their costs, and is to be of a similar standard to departmental purchase agreements. The Commission was also required to report on further savings, beyond those arising from changes in employment conditions and rosters, including appropriate areas for introducing contestability.

In February 1995, the government announced that a wide-ranging review of the organisation of emergency services would be undertaken.

Conclusion on the Outcome of the 1993/94 Internal Review

While the review accepted that the NZFS is effective in extinguishing fires, it clearly established that the NZFS has been poorly managed. Substantial deficiencies in management, organisation structure, financial management and planning were identified in the review. All reports criticised the excessive cost of career personnel

arising from restrictive work practices and penal payments. The review did not, however, address the underlying reasons for the deficiencies identified. These relate to the absence of competition in the supply of fire services and weak monitoring of government agencies. These matters are discussed later in this report.

2.4 INTERNATIONAL COMPARISONS OF FIRE STATISTICS

International comparisons of the costs of fire services and the level of fire losses provide some insights into whether New Zealand's arrangements are likely to be optimal. Table 2.1 provides information on the following:

- direct fire losses as a percentage of GDP;
- deaths from fire per 100,000 of population; and
- the costs of fire services as a percentage of GDP.

The information provided is generally an average of data for the three years to 1988.

The collection of internationally comparable fire statistics is in its infancy and caution is required in drawing firm conclusions from the limited data available. Furthermore, factors such as climate, population density and building regulations, which are not taken into account, can be expected to affect the relative position of countries. In addition, statistical inconsistencies inherent in cross-country analysis may diminish the significance of differences shown in the table.

The following points may be drawn from Table 2.1:

- New Zealand is ranked around the middle of the 15 countries listed in terms of direct fire losses as a percentage of GDP, rate of deaths from fire and the costs of fire services in relation to GDP;
- Denmark recorded the lowest cost of fire services, at half that of New Zealand. Wilmot (1992) notes that Denmark's low costs reflect "the strength of the privately owned 'Falck' fire services"; and
- the low level of fire losses in Japan is partly attributable to the emphasis on fire prevention which is reflected in the costs of its fire services.

With this background on the development and organisation of urban and rural fire services in mind, the public policy framework for the provision and funding of fire services and for related risks is examined.

TABLE 2.1
INTERNATIONAL COMPARISON OF FIRE STATISTICS
Average for 1986 to 1988

COUNTRY	DIRECT FIRE LOSSES	DEATHS FROM FIRE	FIRE SERVICE COSTS
	% GDP	Per 100,000	% GDP
Austria	0.21	0.81	NA
Belgium	0.40	1.78	0.18
Canada	0.19	2.20	0.16
Denmark	0.31	1.50	0.09
Finland	0.22	2.46	0.18
France	0.29	1.34	NA
Germany	0.18	0.96	NA
Japan	0.18	1.60	0.28
Netherlands	0.22	0.57	0.17
New Zealand [1]	**0.26**	**1.68**	**0.18**
Norway	0.49	1.64	0.13
Spain	0.12	1.15	NA
Sweden	0.27	1.57	0.25
United Kingdom	0.21	1.81	0.26
United States	0.18	2.63	0.29

1 The NZFS data suggest the death rate for New Zealand was 1.31.
Source: Wilmot (1992).

3 PUBLIC POLICY FRAMEWORK

Economic efficiency is the primary criterion that should determine whether resources are appropriately committed to the provision of fire services, the prevention of fires and similar contingencies, and to insurance. The general principle underlying the notion of efficiency is that resources should be allocated to any use up to the point where the marginal social benefit is equal to the marginal social cost. These are static aspects of efficiency. A further aspect is dynamic efficiency which is concerned with the optimal balance between the satisfaction of current and future wants and involves optimal investment decisions. In the remainder of this report, the term efficiency is used in its technical economic sense unless otherwise indicated.[19]

Another criterion that is relevant in examining government policy is equity. The principle of horizontal equity requires that people in like circumstances be treated the same. Vertical equity requires, among other things, that people with higher incomes should generally pay more than others toward the cost of tax-financed services. However, neither of these aspects of equity specify the relative extent to which poor and well-off people should contribute to government services. A further concept of equity is that individuals should have equal opportunities. People who hold this view emphasise access to government services rather than equality of outcomes (for example income distribution). Another aspect of equity is the view that government policies should be perceived to be fair.

These equity criteria are less precisely defined than the concept of efficiency because people hold varying views on equity. Governments are nonetheless required to determine whether particular policies and changes to them are equitable. Questions of equity, other than the fairness of processes, are generally assumed to be of limited importance in examining microeconomic issues whereas they are often of prime importance in examining income distribution and other economy-wide policies. Equity issues primarily arise in this study in relation to the perceived fairness of funding arrangements. In many situations the pursuit of efficiency is consistent with the achievement of equity objectives. However, if equity and efficiency objectives are in conflict, a trade-off between them is required (Okun (1975)).

3.1 PROPERTY RIGHTS AND TRANSACTION COSTS

The system of property rights, comprising all the limitations, constraints or rules governing the way in which people in society compete and interact, affects the incentives for individuals and firms to use resources optimally. It is thus critical to the achievement of efficiency. The following three main features define the nature of property rights:

- the extent to which the owner alone may decide on the property's use, for example whether the owner can use the resource and impose costs and benefits on other people without compensation being paid or received;
- the rights of the owner to extract income from the use of the resource; and

19 Fire services may be inefficient in an economic sense because too few resources are devoted to them, but this would not necessarily imply that the NZFS is technically inefficient (in the ordinary sense of the word) in extinguishing fires etc.

- the rights (if any) of the owner to transfer or sell the rights to the property or resource.

The nature of property rights determines the incentive for individuals and firms to use resources optimally. If resources are non-exclusive, the incentive for individuals to use them wisely is diminished. The reward to each fisherman from conserving fish stocks would, for instance, be limited if the right to fish were available to everybody without charge. Similarly, if the right to the reward from successful research and development is not protected at all, firms would have little incentive to invest in such activities. On the other hand, if innovators are excessively protected, they would have limited incentives to produce efficiently. Thus the nature of property rights is critical to the promotion of efficiency.

Defining and enforcing property rights is costly. For this reason, they are seldom fully specified.[20] The extent to which the owner's exclusive rights are limited will vary depending on the costs involved. A factory owner, for example, is unlikely to be given an unrestricted right to discharge toxic gases because of the harm which that action would impose on the public and other businesses. In order for land owners to enforce their rights, they must incur the cost of constructing fences to keep other farmers' livestock off their land. The government can, however, reduce such costs by providing general rules relating to the sharing among neighbours of the costs of erecting boundary fences.

The more precisely property rights are defined, the less is the uncertainty faced by their owners and the lower are the transaction costs of determining how resources may be used. Provided property rights of a particular attribute are adequately defined, they can be modified by market transactions. The right to the income stream from a government bond can, for example, be sold separately from the right to the principal. If market transactions were costless, rearrangement of rights would always take place if it would lead to an increase in the value of production. In these circumstances, the allocation of resources would be unaffected by the initial distribution of property rights (Coase (1960)). However, Coase noted that:

> In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on. These operations are often extremely costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the price system worked without cost.

Because of transaction costs, the rearrangement of the initial property rights will not occur unless the increased value of production is greater than the costs of bringing it about. Thus the initial allocation of property rights raises efficiency and equity issues (Coase (1960)).

A key role of the government is to define property rights as precisely as possible and to provide a general framework for their subsequent change by negotiation (contract) and for their enforcement at optimum cost. The government's overall aim should be to minimise production and transaction costs. Where property rights could be modified on a voluntary basis at a lower cost than by government action, the former course should be adopted. This role extends to the general framework within which all activity takes place, such as the establishment of offences, the provision of police to

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20 The cost involved is known as a transaction cost. Cowen (1988) defines transaction costs as any obstacle to market exchanges that interferes with or discourages the process of transacting.

enforce property rights, and the court system to adjudicate on disputes and to impose penalties on individuals who infringe the rights of other people. It also includes institutional arrangements that reduce transaction costs such as the land registration and transfer system, and contract and company law.

There are grounds for concluding that the existing property rights system is unlikely to be optimal. Planning processes tend to be excessively legalistic and to discourage voluntary contracting because property rights are poorly specified. This affects the efficiency of fire services and related activities. The contribution that an improved system of property rights and lower transaction costs relating to the supply of fire services could make to the maximisation of community welfare is examined later.

3.2 ROLE OF THE GOVERNMENT IN RELATION TO FIRE SERVICES

The primary role of the government in relation to the fire services is to provide a regulatory environment that encourages optimal investment in the prevention of losses from fires, accidents and similar contingencies for which fire services may be required, and appropriate levels of insurance.[21] Loss prevention includes the avoidance of fires by, for example, the adoption of safe work methods, the use of fire resistant building materials and the installation of fire protection devices such as automatic sprinklers. It also includes the minimisation of loss of life and personal injury, and property and other losses that arise when fires occur. Loss prevention is a broad activity of which fire services are a part.

From a public policy perspective, an efficient level of loss prevention is achieved when the expected benefit from spending an extra dollar (in present cost terms) on prevention equals one dollar. Similarly, the efficient level of insurance cover is achieved when the marginal benefit from additional insurance just balances the marginal cost of that cover.

The requirement to equate marginal social costs and benefits means that the elimination of all costs associated with fires is unlikely to be desirable, even if this were practicable. Firms and individuals can be expected to bear the costs of a fire where this is cheaper than prevention. Similarly, they may choose to be uninsured (that is, to self-insure) where this would be less costly than buying insurance. The cost of providing insurance for some contingencies, for example, may be such that insurance is not available on the market (for example because the expected loss is too uncertain). In this case, self-insurance may be an efficient outcome (Demsetz (1969)).

The amount of spending on loss avoidance, prevention and insurance is inter-related. The optimum amount of expenditure committed to these activities is difficult to determine. The costs of obtaining relevant information, such as the probability of a fire and the likely loss, are high. Individuals and firms can, nevertheless, be expected to devote resources to research these matters to the extent that they judge that it is beneficial to do so.

An important aspect of an appropriate regulatory environment is that property rights be clearly specified and are capable of enforcement at the lowest possible cost. It is also necessary that regulations relating to buildings, health, safety and insurance facilitate optimum trade-offs. Impediments to the efficient functioning of the relevant markets, including inadequacies in the specification of property rights, are examined below.

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21 The contingencies for which fire services may be required are referred to simply as fires, unless otherwise specified.

3.3 IMPEDIMENTS TO EFFICIENT SPENDING ON LOSS PREVENTION

Present Regulatory Approach

A wide range of government policies impact on the relevant trade-offs, some of which are briefly reviewed in this section. The Resource Management Act 1991 is the principal statute governing the management of land, subdivision, water, soil resources, the coast, air and pollution control. The Act's purpose is to promote the sustainable management of natural and physical resources. The system of plans established under the Act, and of consents for land uses which do not conform with those plans, may affect the risk of fire and loss from similar contingencies. In addition, the Act provides for the management of hazardous substances.

From a fire safety perspective, the Building Act 1991 is an important statute. One of the purposes and principles of the Act is to provide:

> Necessary controls relating to building work and the use of buildings, and for ensuring that buildings are safe and sanitary and have adequate means of escape from fire.

To achieve this purpose, the Act requires that particular regard be had to:

- the need to safeguard people from possible injury, illness or loss of amenity in the course of the use of any building, including reasonable expectations of any person who lawfully enters a building for rescue operations and firefighting;
- limit the extent and effects of the spread of fire; and
- make provision in a building used for the storage or processing of significant quantities of hazardous substances to prevent significant adverse effects on the environment arising from an emergency involving fire within the building.

The Act requires the Building Industry Authority (BIA), which was formed under the Act, to prescribe a building code with which new buildings, alterations to buildings and the operation of certain buildings are required to comply. The BIA is required to consult with the Commission on specific matters relating to fire safety.

The Building and Resource Management Acts are intended to be less prescriptive and more flexible than the legislation they replaced, thereby promoting greater innovation and efficiency. The building code, for example, specifies the objective to be achieved, the functional requirement and the performance required. These matters are commonly expressed in qualitative terms. The BIA has published non-mandatory approved documents that specify in greater detail how the provisions of the code may be met. Four such documents relate to fire safety; outbreak of fire; means of escape; spread of fire; and structural stability during a fire. Building owners are permitted to adopt alternative ways of complying with the code but the burden of proof of compliance rests on the owner.

The responsibility for the administration and enforcement of the Building Act lies with territorial local authorities. The construction, alteration or demolition of buildings cannot generally be carried out without first obtaining a building consent from the relevant territorial authority. An owner must advise his or her local authority that building work has been completed to the extent required. This may entail the submission of a compliance certificate issued by an approved building certifier stating that the provisions of the code have been met.

Unlike previous legislation, the Act requires the owners of certain new and existing buildings to demonstrate annually that their buildings comply with the requirements of the Act. They are required to obtain a compliance schedule. This provision does not apply to a building used as a single residential dwelling or to buildings other than those that contain any of the following systems:

- automatic sprinkler systems or other automatic fire protection systems;
- automatic doors, which form part of any fire wall and which are designed to close shut and remain shut on an alarm of fire;
- emergency warning systems for fire or other dangers;
- emergency lighting systems;
- escape route pressurisation systems;
- riser mains for fire service use;
- any automatic back-flow preventer connected to a potable water supply;
- lifts, escalators or travelators or other similar systems;
- mechanical ventilation or air conditioning systems serving all or a major part of the building;
- any other mechanical, electrical, hydraulic, or electronic system whose proper operation is necessary for compliance with the building code;
- building maintenance units for providing access to the exterior and interior walls of buildings; or
- such signs as are required by the building code in respect of any of the above-mentioned systems.

The compliance schedule is issued by the local territorial authority. It is required to specify the inspection, maintenance and reporting procedures to be followed by independent qualified persons (IQPs) in respect of the above systems. If a compliance schedule is required, it is to include systems or features relating to the means of escape from fire, safety barriers, hand-held hose reels for firefighting and signs required by the building code.

Owners of buildings for which a compliance schedule is necessary are obliged to supply to the local authority an annual warrant of fitness stating that the requirements specified in the compliance statement have been fully complied with during the previous 12 months. Before the owner can submit a warrant of fitness, an IQP must inspect the relevant systems and verify that they meet the requirements of the compliance schedule.

A building owner must advise the territorial authority if it is proposed to change the use of a building or to extend its life and if alterations are required to bring the building into compliance with the building code. The use of a building cannot be changed unless the territorial authority is satisfied on reasonable grounds that, in its new use, the building will comply with the provisions of the building code for the means of escape from fire, protection of other property, and structural and fire-rating behaviour. The building is required to continue to comply with other provisions of the building code to at least the same extent as before the change of use.

In exercising the above powers, a territorial authority is required to have due regard to the following:

- the size and complexity of the building;
- the location of the building in relation to other buildings, public places and natural hazards;
- the intended life of the building;
- how often people visit the building;
- how many people spend time in, or in the vicinity of, the building;
- the intended use of the building, including any special traditional and cultural aspects;
- the expected useful life of the building and any prolongation of that life;
- the reasonable practicality of any work concerned; and
- in the case of an existing building, its special historical or cultural value, if any.

A building may be deemed to be dangerous if, by reason of fire hazard and occupancy, it would be likely to lead to an almost certain loss of life in the event of a fire. The territorial authority may seek advice from the NZFS on whether a building is dangerous in terms of the Act. If advice is sought, the territorial authority is required to have due regard to the advice that is tendered.

A territorial authority may prohibit the use of unsafe buildings and it can require that work be undertaken to reduce or remove the danger. Non-compliance with the Act may also result in fines. The penalties have been described as severe by barristers and solicitors Chapman Tripp Sheffield Young (1992). The Act generally involves strict liability where proof of intention is not necessary. Liability can be placed on persons directly or indirectly responsible for the offence which means that the employee (or agent) and principal (or owner) may be held equally liable. The liability in respect of property owned by companies may be placed on the directors or building managers.

The provisions of the Building Act may be more important for personal safety than fire services in the event of a fire. This is because of the rapid speed at which a fire in a structure can develop and toxicity build up.[22] The intention of the Building Act is that the risk of fire be controlled by requiring certain safety standards to be met (for example by requiring that buildings be constructed to maintain structural stability during a fire so that people have adequate time to escape), by safeguarding people from injury or illness while escaping to a safe place and by facilitating rescue and fire fighting operations. While the NZFS does save lives and reduce injuries to the public, a large part of its activities relates to the protection of property.

The Fire Safety and Evacuation of Buildings Regulations 1992 were promulgated under the Fire Service Act 1975. They regulate the means of escape from a wide range of public buildings, require the owners of an estimated 65,708 buildings to put in place evacuation procedures and schemes and contain other provisions relating to fire safety.

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22 A discussion of the speed at which structure fires spread and toxic gases build up is presented in Strategos (1989).

In 1989, the New Zealand Fire Service Commission engaged consultants to examine whether mandatory use of automatic fire sprinklers and similar technology in commercial, industrial, public sector and domestic applications would be cost effective from a community perspective (Strategos (1989)). The report contained a questionable cost and benefit study and failed to address adequately wider economic issues associated with compulsory installation of sprinklers. Strategos concluded that a mandatory approach would not be justified.[23] The fire safety division of the NZFS, however, supports the compulsory installation of sprinklers, for example in boarding establishments and hotels (New Zealand Fire Service (1993)).

The Health and Safety in Employment Act 1992, which replaced the Factories and Commercial Premises Act 1981 and a long list of industry specific legislation that affected safety, requires employers to take all practical steps to ensure the safety of employees while they are at work. Employees are obliged to work safely and to avoid harm to other people. While these provisions primarily relate to work practices and machinery, the Act is broad in its scope and could apply in the case of fire. Significant penalties are provided for non-compliance with the Act.

Evaluation

Individuals and firms have strong incentives to reduce the risk of death, injuries and property losses from fires and similar contingencies. The reputation of a firm would, for example, be harmed if its employees or the public were exposed to excessive risks. To the extent that voluntary spending on loss prevention and loss minimisation would exceed that required by statute, the latter has no direct economic effects. On the other hand, current provisions may impose costs on firms and individuals that would not be voluntarily incurred.

Some regulation aimed at reducing loss of life and injury from fire is likely to be desirable. The transaction costs that would otherwise be incurred by the public in establishing that buildings that they frequent meet at least a minimum level of safety, for example, is likely to be excessive relative to the costs of prescribing and enforcing minimum requirements. This suggests that the requirement to provide alarms and reasonable means of escape in the event of fire are likely to be justified in at least some circumstances. A focus on buildings that are commonly frequented by the public and where large numbers of people are potentially affected, as in the Building Act, is likely to be appropriate because the benefits are more likely to justify the costs than in other situations.

It is too early to judge the overall effectiveness of the Building Act. It is unlikely, however, that the current law results in optimal trade-offs among the costs of fires, loss prevention and insurance. The range of circumstances and the associated differences in the costs and benefits of particular preventive measures suggest that it would be remarkable if existing rules were optimal in all or even most circumstances. Furthermore, the public policy maker has insufficient information to make the necessary judgments. Finally, regulations are unlikely to reflect changes in relative

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23 The study was superficial given its terms of reference. Some of the analysis is debatable. The benefits arising from lives saved, for instance, were understated by a factor of around three because the average number of occupants in each house was not taken into account. Lower insurance premiums were included as benefits. This appears to result in double counting of benefits from lower property losses because insurance premiums largely represent a transfer of risk among residents rather than a resource cost. A United States observer (Dr John Hall, Director of Fire Analysis, National Fire Protection Association) noted several methodological errors in the study and implied that it appeared to be insufficiently rigorous. Source: personal communication dated 9 April 1990 from Mr Robert W Grant, President, National Fire Protection Association, to Chief Fire Officer J R Godfredson, Metropolitan Fire Brigades Board, Melbourne.

prices quickly (for example those that occur in response to technological developments) which alter the costs and benefits of particular trade-offs.

The environment in which trade-offs among prevention, insurance and loss from fires are made would be improved if greater recognition were given to private property rights and less to regulating resource use and health and safety. This would provide better incentives for individuals and firms to make optimum trade-offs. Recent legislation has incorporated a small step in this direction. A similar view has been advanced in greater detail in related studies that the NZBR has undertaken.[24]

The possibility of introducing transferable rights to adopt a lower standard of fire safety than that implied by the Building Act should be examined. This would enable the marginal value of such regulations to be quantified thereby facilitating an evaluation of the costs and benefits of present regulations. It would also enable lower standards to be adopted in those circumstances where the costs of compliance are highest. A similar approach to pollution has been adopted in a limited number of instances overseas.

Voluntary investment in loss prevention can be expected to be discouraged by the provision of fire services when charges are unrelated to the risks involved or the use that is made of the service. These factors are also likely to promote an excessive investment in firefighting (Poole (1988)). An illustration of these biases is provided by the previous practice of not charging for false alarms arising from faulty equipment or inadequate maintenance of alarm systems. In 1989 7,410 or 17 percent of all incidents attended by the NZFS were classified as false alarms arising from defective apparatus or installation. Because firms did not bear the costs of these call outs, their incentive to maintain alarms was weak. The introduction of charges for false alarms arising from faulty equipment has coincided with a sharp decline in such incidents. In 1992 there were 5,640 such incidents (13 percent of total incidents), a decline of 24 percent from 1989.[25]

The efficiency of investment in loss prevention would also be enhanced if the market for fire services were subjected to greater competition and if the NZFS were required to compete for business on a competitively neutral basis. These arguments are discussed later.

3.4 GROUNDS FOR PUBLIC PROVISION AND FUNDING OF FIRE SERVICES

Another key aspect of the regulatory environment within which decisions concerning loss prevention and insurance are made relates to the provision of firefighting services. In respect of urban areas, these are largely publicly provided by the Commission and mainly funded by the levy which is compulsory if fire insurance is bought. Privately provided and funded fire services are maintained at a limited number of large industrial plants, such as the oil refinery at Marsden Point and the Huntly power station, and by commercial forest owners.[26] The levy is generally charged in respect of property (other than commercial forests) which is protected, at least to some extent, by privately provided and funded fire services.

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24 See NZBR (1987b), (1988), (1990c), (1990d) and (1991a).

25 Source: New Zealand Fire Service Emergency Incident Statistics 1989 and 1992. False alarms of all classes accounted for 30 percent of total incidents in 1992. The classification of false alarms was modified in 1993 and for this reason the data have not been updated.

26 McLean (1992) lists fire brigades registered with the New Zealand Fire Service.

The question that needs to be addressed is whether there are valid grounds for the public provision, funding or both of fire services. Strategos (1989) argued that fire services are to some extent public goods and that they should therefore be funded by central government from tax revenue. The degree to which fire services can properly be considered public goods deserves closer scrutiny than that undertaken in the Strategos report which focused on an economic appraisal of suppression technology. Moreover, the proposition advanced by Strategos that public goods should necessarily be funded from tax revenue is not supported by a contemporary analysis.

Public Goods and Transaction Costs

An unassisted private market might provide insufficient fire services if such services exhibit significant features of public goods. According to Samuelson (1970), pure public goods have two key properties. First, it is undesirable to exclude individuals from enjoying the goods as the enjoyment of them by one person does not detract from that of other people (the non-rivalrous property). This property implies that the marginal cost of the goods is zero and thus their marginal price should also be zero. Second, it is not feasible to exclude individuals from enjoying the benefits of the goods (the non-excludability property). This is the free-rider problem which may impede the production of goods and services.

While few, if any, goods and services satisfy fully the criteria of pure public goods, many goods exhibit some of their characteristics. In most of these cases the benefit of government action does not outweigh related costs. On the other hand, some goods and services exhibit sufficient characteristics of pure public goods that government action is desirable to achieve a socially optimum level of production. The form of any such intervention should be optimal.

The non-rivalrous property clearly does not apply to fire services. The provision of fire services involves a positive marginal cost. If fire services are committed to a particular emergency, they can only be diverted to another at a cost. Similarly, a cost is incurred in expanding the fire services as the resources involved have alternative uses.

The non-excludability property does not necessarily apply to fire services. It is feasible to exclude individuals from the benefit of fire services (Stiglitz (1988)). The fire service could, for example, answer calls only from property owners who subscribe, or agree to pay, for its services. The survey in section 2 suggests that in the formative days of firefighting, fire brigades that were funded by insurance companies sometimes declined to fight fires in uninsured buildings. Some subscription fire services in the United States are reported to operate on this basis, although most extinguish fires and follow up the question of charges later.

The right to decline to provide goods and services to consumers who are not prepared to pay for them is the main means by which the free-rider problem is addressed in private markets. Nobody, for instance, would seriously expect retailers of luxury cars to provide such cars to customers who have no intention of paying.

Financial institutions may also play an important role in limiting free-riding in respect of fire services. Insurance firms have an interest in ensuring that the insured takes steps to prevent fires and to minimise losses from fires. The provision of fire services is a relevant factor in setting premiums. In the United States, a discount on insurance premiums is generally provided where the insured subscribes for privately provided fire services.[27]

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27 In the United States discounts on insurance premiums may exceed the costs of the fire service subscription. The reason for this is unknown. A householder could expect a discount on his or her

Banks and other lenders normally require that property pledged as security be insured against loss from fire. This is one reason why most houses are insured against loss from fire, although self-interest is likely to be a more important reason for buying insurance.[28] In the absence of a publicly provided fire service, prudent lenders could be expected to require borrowers to provide adequate fire suppression and extinction services or to subscribe for such services. The combined actions of insurance companies, lenders and the self-interest of property owners could be expected to limit any free-rider problem that arises in respect of fire services.

A contemporary analysis would view the public goods problem in the context of transaction costs. Transaction costs may be defined as any obstacles to market exchanges that interfere with or discourage the process of transacting (Cowen (1988)). They are pervasive. The role for the government is to establish a regulatory environment that reduces transaction costs to an optimal amount.

The transaction costs of excluding people from using fire services are not excessive, as illustrated by the existence of privately provided and funded fire services in some areas of the United States and by some industries in New Zealand.[29] Private subscription fire services are provided in at least sixteen communities in the United States. The oldest service started in 1948. Private fire insurance contracts, which generally provide discounts for subscribers to fire services, discourage the free-rider problem. While the existence of these services suggests that privately provided and funded fire services are feasible, some providers have encountered problems in collecting subscriptions.[30]

The essential problem in respect of most fire services is not the inability to prevent excessive free-riding but the adverse public reaction to the consequences of taking steps to limit non-payment such as withholding service (Stiglitz (1988)). This is referred to as the perceived free-rider problem. It arises particularly where lives might be put at risk. The perceived free-rider problem seems to be less of a problem in respect of rural property where traditional fire services are not available or where their effectiveness is limited by particular circumstances (for example by a long response time and inadequate water supplies).

If the community decides that the refusal to supply fire services to at least some non-payers is an unacceptable approach to containing the free-rider problem, and if the self-interest of insurance companies, lenders and property owners would be insufficient to contain free-riding to an optimal level, government intervention may be

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insurance premium, in the absence of transaction costs, equal to the expected reduction in losses attributable to the provision of fire services. At the margin this discount should equal the cost of providing fire services and hence the subscription cost. Transaction costs would tend to drive a wedge between the expected reduction in fire losses and the reduction in the premium. This would be a further reason for expecting the subscription to exceed the discount offered.

28 Research undertaken in 1988 suggested that only 2 to 2.5 percent of domestic buildings were uninsured and 11 percent of households did not insure the contents of domestic buildings (see Harrison *et al.* (1994)). Almost 47 percent of privately owned dwellings are owned without a mortgage.

29 Poole (1988) reports that the traditional tax funded government fire department is the rule in a minority of American communities, though such communities contain the majority of the population. Examples of subscription fire services are presented in Section 4 below and in Guardiano, Haarmeyer and Poole (1992), Poole (1988) and Simmonds (1989).

30 The Lewiston Rural Fire Service began providing a fire service in an area of Idaho which previously had no fire services. Initially it attended fires in properties owned by non-subscribers but found that the collection of fees from non-subscribers was only 18 percent. In response, it adopted a more discriminating policy under which fires affecting non-subscribers' properties are only fought in certain circumstances, for example if life or a subscriber's property is at risk.

required to ensure the production of appropriate fire services. It would be necessary to show that the marginal benefits from increased production of fire services outweighed the related costs. If government action is justified, the imposition of an obligation on property owners to subscribe for a minimum level of fire services relative to the risks involved, or to provide equivalent services themselves (with appropriate enforcement), may be appropriate. The government may also need to take steps to enable suppliers of fire services to recover user charges.

Mandatory services would be limited to the preservation of life, the minimisation of personal injuries and the protection of neighbouring properties from loss. The grounds for attempting to prevent other losses of private property (for example losses suffered by the property owner concerned) are weak.[31] Similarly, there are no compelling grounds for not withholding most special services, such as water evacuation, which are unrelated to the saving of lives or the minimisation of injuries.

The suggested approach is analogous to the classic free-rider problem - that of providing lighthouses. The provision of lighthouses is often cited in economic analyses as an example of a public good that should be financed from general taxation. It is claimed that insufficient lighthouses would be constructed if they were provided privately because they benefit shipowners who would not contribute to their costs. This proposition led to the view that public provision and tax funding of lighthouses are desirable. Coase (1988), however, argued that in eighteenth century England this problem was overcome by government action requiring ships entering port to pay a fee toward the provision of lighthouses along with port fees:

> ... lighthouses were built, operated, financed and owned by private individuals, who could sell the lighthouse or dispose of it by bequest. The role of the government was limited to the establishment and enforcement of property rights in the lighthouse. The charges were collected at ports by agents for the lighthouse. The problem of enforcement was no different for them than for other suppliers of goods and services to the shipowner. The property rights were unusual only in that they stipulated the price that could be charged.

Coase concluded that the provision of lighthouses is not an activity that only the government can provide and which should be financed from general taxation. A similar conclusion applies in respect of the perceived free-rider argument for collective provision of fire services.

The view that fire services do not generally reflect significant characteristics of public goods has received some support in the limited literature that is available. Poole (1988) notes that:

> A great deal of fire protection is inherently a private, rather than a public, responsibility. The way the building is designed, built, and maintained is important. The owner's investment in protective features (for example alarms, sprinklers) has a great deal to do with the probability and seriousness of fires. ... The existence of subscription fire services provides additional evidence that fire protection is not a public good ... . A further example of private fire protection is the industrial fire department.

Although Hensley *et al.* (1989) did not address the issue of whether rural fire services constituted public goods, their recommendations were predicated on the view that such services were essentially of a private nature. Similarly, Mark (1983) correctly

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31 The experience of the insurance industry is that total loss is the norm for structure fires in rural districts.

viewed the fire service levy as a method of imposing the costs of fire services on individuals and firms that benefit from the provision of those services.

The characteristics of public goods in the economic literature are not always well understood by those engaged in debates on the provision and funding of fire services. In 1990 the ministers of internal affairs and conservation commented that rural firefighting involves both public and private good components. They then wrote:

> In the case of forests which are commercial or semi-commercial, the level of fire risk is usually correspondingly higher than most rural fire risk. Control of that fire risk can be seen as a private good which ought to be met by these forest owners ... . The exclusion of N.Z. Defence Force rural districts is also justifiable on the grounds that their fire risk is substantially of their own making. This leaves the rest of the rural community where control of fire risk is properly a public good." [32]

This argument, which suggests that the level of risk is relevant in determining whether goods and services are of a public or private nature, is invalid. This has apparently been recognised. Internal Affairs and Treasury advised the working party on the fire service levy that the principles underpinning its terms of reference included the view that "the provision of fire safety and suppression outputs by the Fire Service Commission is ... substantially in the nature of a private good."[33]

The chief executive of the fire service has suggested that fire and police services should be treated the same (Cummings (1994)). Police services are generally publicly provided and funded, although considerable expenditure aimed at deterring crime and apprehending offenders is borne privately (for example the installation of locks and fences and the provision of security guards). The most persuasive argument for the present treatment of many police services rests on the view that public funding and provision are desirable to further the freedom of the individual. This ground for government action does not apply in the case of fire services.

The NZFS carries out limited activities that might justifiably be funded from general taxation. The transaction costs of imposing the costs of civil defence, either directly or indirectly, on the beneficiaries of such services are likely to be excessive. The scope of such services is, however, substantially narrower than those that are loosely referred to as public goods by some commentators.

While high transaction costs may justify general tax funding of some activities, they would not necessarily justify their provision on a collective basis. The prevention, suppression and extinguishing of fires, hazardous substances emergencies, extraction of people from vehicles, smoke removal, water evacuation and other emergencies, and false alarm calls should generally be paid for by the beneficiaries. The present levy should be viewed as an indirect user charge, similar to the lighthouse example, rather than as a general tax. One question to be addressed later in this report is whether a more efficient system of charging for fire services is desirable.

Externalities

Another possible ground for examining whether public provision and funding of fire services is justified relates to whether fire services lead to significant externalities. This argument is commonly advanced in support of the collective provision, funding or both

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32 See Austin and Woollaston (1990).

33 Harrison *et al.* (1994).

of fire services. An externality arises whenever an individual's action affects the welfare of another. From the community's point of view, externalities may result in a sub-optimal production of goods and services because decisions on the level of production will reflect private rather than community-wide benefits. Most activities produce either positive or negative externalities and most do not justify government action. The issue for public policy is whether the marginal benefit of government action aimed at addressing externalities is likely to outweigh the costs involved. Even if an externality provides valid grounds for government action, the government would need to choose the optimal instrument to address the problem (for example regulation or public funding).

In the case of fire services, an externality arises from the possibility of a fire in one property spreading to adjacent properties. Decisions taken last century to prohibit the use of raupo and timber as building materials in Wellington and Auckland respectively appear to have been justified on externality grounds. Similar arguments may have justified the regulation of the distance between buildings in which corn straw or other inflammable material could be stored under the Municipal Corporations Act 1867.

If a property owner is lax in preventing and extinguishing fires, the risk of loss faced by adjacent property owners may be increased. This risk, however, is not the same for all property owners or for all classes of fire. A city homeowner generally faces a greater risk of loss arising from a fire that starts in his or her neighbour's property than a rural homeowner. Within a city or town, the risks faced by property owners will also differ depending on factors such as the proximity of other buildings, construction materials used and the nature of activities that are undertaken on the property.

The provisions of the Resource Management Act 1991 and the Building Act 1991 (and similar previous legislation) and the activities of the NZFS appear to have reduced the risk of fires spreading from one property to another. Commission statistics suggest that such fires typically account for less than 1 percent of all fires attended.

A market response to the problem of fires spreading from one property to another is to permit the owner of the property that is damaged to recover the loss incurred from the person responsible for the fire. In this event, insurance markets would emerge to enable property owners to manage the risk involved. The current law generally prevents this from occurring. Section 86 of the Fires Prevention (Metropolis) Act 1774, a United Kingdom statute that still applies in New Zealand, provides that no action shall be brought against a person in whose premises a fire accidentally begins. The courts have interpreted this provision to mean "without negligence". There are, however, two important exceptions:

- under the rule in Rylands v Fletcher, a person may be liable to third parties for loss from fire where fire arises from a non-natural use of land.[34] In this case, strict liability applies (that is, it is not necessary to prove that the property owner knew or ought to have known that the fire would damage property belonging to a third party). The spread of a fire from a deliberate burn-off of scrub could fall within this rule; and

- a property owner or an occupier may be liable for losses incurred by a third party if a fire, which starts accidentally, escapes as a result of the negligence of the owner or occupier, including their servants or independent contractors.

There is a further possibility of liability in nuisance. It might be argued that a person's actions unjustifiably interfered with the enjoyment by a third party of his or her

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34 Rylands v Fletcher [1868] L. R. 3 H. L. 330.

property. This might apply where the fire was caused by a dangerous state of affairs (for example unsafe electrical wiring).

There is provision in the Forest and Rural Fires Act 1977 for the costs of firefighting and for any loss or diminution in the value of property, including any consequential loss or damage that is not too remote in law, to be recovered from the person who acknowledges responsibility for the fire or who is proven to have caused it. This provision, which is supplemental to any other rights that might be available to a claimant, is applied whenever the offending party can be found.

All property owners should be given the right to recover losses incurred from other neighbouring property owners as a consequence of accidental fires that spread to their properties. In most cases, this would generally enable the costs to the community (not just private costs) to be imposed on the owner of the property that initially caught fire. The incentives for property owners to invest in fire prevention and loss mitigation would be enhanced.

This approach would not address fully problems which arise where fire losses are due to arson, where the person responsible for a fire cannot be found, and where the owner whose property initially caught fire is uninsured and has insufficient net assets to compensate other property owners.[35] The preferred solution in the first case is for the courts to require offenders with sufficient assets to pay restitution for fire losses but such recourse is unlikely in most cases (Becker and Landes (1974)). Neither of the remaining problems is likely to be sufficiently large to justify further government action. Similar problems arise in respect of contingencies other than fire (for example motor vehicle accidents) and have not justified government intervention. The affected property owner's insurance would compensate him or her for the loss in such cases and the costs incurred would be reflected in the price of insurance.

The prohibition on the right to sue in the case of loss of life and personal injury caused by accidents under the Accident Rehabilitation Compensation Insurance Corporation (ARCIC) scheme leads to a divergence between private and community costs similar to that of the Fires Prevention (Metropolis) Act 1774. As noted below, the solution to this problem lies in reform of the ARCIC scheme.

Concluding Comment

Public provision or funding of fire services cannot be justified on public goods or externality grounds. Even if one were to conclude that the transaction costs involved in funding fire services were generally excessive and thus the collective funding of services were justified, this would not apply universally. Where there is a low risk of fires spreading to other properties (for example in rural areas) and where firms have adequate services of their own, the case for compulsorily funded fire services is difficult to sustain. Moreover, the case for collectively provided fire services is weak.

This conclusion is similar to that of Thurow (1974) who is sceptical of an externality argument for public provision of more than limited fire protection. He commented on this issue in the context of arguing that it is necessary for the welfare of the donee to affect donor's welfare to justify public provision of services:

> Some limited amount of fire protection and code enforcement is necessary to prevent conflagrations, but beyond this a donor has no more interest in his neighbor's fire protection than in his neighbor's insurance.

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35 Insurance policies do not normally cover losses arising from unlawful activities of the insured.

It is also consistent with the view of Poole (1988) who commented in respect of the United States:

> Not only can fire protection be charged for, it can also be provided by the private sector.

The only possible ground for government action is that the community will not permit the free-rider problem to be addressed in the normal way. This would, at most, suggest action aimed at enhancing the property rights of private providers of fire services rather than the public provision of fire services. The government should also take steps to remove impediments to fire prevention by allowing property owners to recover the costs of all fires from persons who are responsible for them.

3.5 IMPEDIMENTS TO EFFICIENT RISK SHARING

The market for fire and related insurance should play a crucial role in providing appropriate incentives for loss prevention. To achieve economic efficiency, risk sharing arrangements must create incentives for those at risk to adopt optimal combinations of insurance and prevention. The problem for public policy is to determine the set of rules that allow the greatest overall well-being to be achieved at the lowest cost.

The demand for insurance by individuals is traditionally explained by the desire of risk adverse individuals to reduce the variability of their consumption opportunities over time. This explanation does not, however, explain the demand for insurance by large companies that hold a diversified pool of assets or whose shareholders could hold a diversified portfolio of investments. In these cases, the firm or the investor is able to spread risk without recourse to insurance markets. Large firms, however, typically buy insurance.

Mayers and Smith (1982) argue that the demand for corporate insurance is explained by the role which insurance plays in controlling incentive conflicts. Such conflicts arise whenever cooperative action is required and welfare maximising individuals are faced with alternative choices. In elementary models, incentive conflicts are assumed to be controlled costlessly. In such an environment, contracts can be costlessly negotiated, administered and enforced, and there would be no demand for a resource-consuming insurance industry. However, where transaction costs are positive (that is where negotiation, information, administration and litigation costs apply), optimal contracts will provide less than full control of real choices.

One incentive conflict which insurance markets seek to control is that between the policy-holder and the insurer. The change in the behaviour of individuals and firms following the purchase of insurance is referred to as moral hazard. A policy-holder could, for example, be more willing to employ unsafe work habits after buying insurance than would otherwise be the case. Another incentive problem is that of adverse selection where firms that face the greatest risks buy insurance.

Insurers have developed policies to limit moral hazard and adverse selection problems. These include the grouping of similar risks into categories for premium purposes, applying an excess to policies, co-insurance (where the policy-holder bears part of the risk) and limits on the amount of cover. Moral hazard and adverse selection essentially arise from the costs of collecting information. The government can only improve the outcome if it is able to collect information more efficiently than market participants. This is unlikely to be the case because the government faces weaker incentives to undertake these activities than private insurers. The difficulty of

controlling the costs of government-operated insurance schemes, such as the ARCIC scheme, supports this view.[36]

The insurance market provides information that is useful in evaluating the costs and benefits of preventive measures. Through specialisation, insurers have developed a comparative advantage in assessing risks (Mayers and Smith (1981)). They also have incentives to evaluate risks and to reflect these in the price of policies offered. Purchasers of insurance can use this information in assessing whether preventive measures are cost effective. This process facilitates efficient decisions on investment in loss minimisation and insurance. It requires that policy-induced impediments to an efficient insurance market be eliminated.

It is widely accepted that consumer welfare is enhanced where policy-induced barriers to entry into, and exit from, an industry are low (Demsetz (1982)). The monopoly role of the ARCIC constitutes a substantial barrier to entry into the accident insurance market in New Zealand. Similarly, the public funding of about 80 percent of all health costs, which has similar economic effects to a highly subsidised and protected health insurer, substantially retards the market for health insurance.

The ARCIC scheme is a major impediment to efficient decisions relating to loss from accidents, loss prevention and insurance. This arises for the following main reasons:

- the ARCIC scheme is based on the no fault principle. As a consequence, the right of individuals and firms to sue when they suffer a loss as a result of the negligence of other parties is denied. The right to sue in cases that involve a breach of a statutory duty, regardless of negligence, is also curtailed. The effect of these measures is to reduce substantially the incentive for firms and individuals to avoid accidents and the consequent loss of life, personal injury and property losses, and to commit resources to loss minimisation.

  In public discussions the right to sue has frequently been incorrectly viewed as a method of compensating people who suffer losses. This is an erroneous view. It is the function of insurance markets to provide cover for those who suffer losses whereas the right to sue is primarily an incentive mechanism. The government's 1991 budget paper on the reform of the former Accident Compensation Scheme made this mistake;

- following the 1991 budget reforms, the ARCIC scheme is funded by levies on employers (for work-related accidents) and employees (for non-work-related accidents), and by taxes (in respect of accidents affecting non-earners). The costs of motor vehicle accidents are charged to vehicle owners. ARCIC levies had not been related to the claims experience of the individual or firm concerned. A tentative step toward risk rating has been implemented in relation to the employer's levy. In addition, the classification of industries for levy purposes (that is risk categories) does not reflect that which would evolve in a competitive market. There are fewer risk categories than under the former workers' compensation scheme. These features of the ARCIC scheme reduce the incentive for firms and individuals to undertake appropriate loss prevention;

- the ARCIC scheme is compulsory up to an income level of $76,648 per employee. This provision can be expected to bias the choices of firms and individuals regarding the appropriate level of insurance; and

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36 Several features of the ARCIC scheme do not conform with standard insurance practice. The number of risk categories has been significantly reduced since the scheme was introduced, deductibles and co-payments are low and the claims history of the payer has little influence on premiums.

- ARCIC scheme benefits and conditions of cover deviate significantly from the structure of comparable private insurance arrangements. In addition, between 1985 and 1990, the costs of the Accident Compensation Corporation (ACC, the predecessor to the ARCIC) grew at an alarming 25 percent a year. This reflects the sub-optimal specification of the terms and conditions of the ACC's policies and poor monitoring of its operations. As a consequence premiums are excessive for the cover provided and are distorted. These factors suggest that the scheme provides inadequate control of incentive conflicts.

Fundamental reform of the ARCIC scheme is an essential requirement to facilitate more efficient trade-offs among the avoidance of accidents, loss prevention and insurance. Accident insurance should be subject to competition, consideration should be given to reintroducing the right to sue, at least for cases of gross negligence, and the ARCIC should be privatised or set up on a competitively neutral basis as a state-owned enterprise.

One issue that would need to be examined carefully in reforming the ARCIC scheme would be the extent to which the right to sue should be permitted. The neighbour principle which states that a person owes a duty of care to others in a proximate relationship has been established by the courts. Extensive case law has addressed the question of to whom a duty of care is owed. The extent to which such rights should be permitted would need to be examined because they have efficiency and equity implications.

A relatively unrestricted right to sue, for instance, could lead to excessive investment in activities aimed at protecting the interests of those who might be sued, with a consequent reduction in services and welfare. This seems to be the case in respect of medical malpractice in the United States where unnecessary procedures are commonly performed to protect medical professionals from possible claims and where the costs of insurance have risen rapidly (Danzon (1990)). Ways of reducing the costs of court proceedings, including delays, would also need to be examined.

The funding of most public health from tax revenue also impedes optimal trade-offs among the avoidance of injuries, the minimisation of the cost of injuries and insurance. Consumers do not bear directly the full cost of their health services. As a consequence, they have insufficient incentives to avoid fires and other contingencies and to minimise injuries. Furthermore, individuals and firms are discouraged from buying private insurance. As a result, incentives provided by optimal insurance arrangements are substantially weakened and the generation of useful information is impeded.

Insurance premiums provide information to consumers on the relative risks they face. Insurance contracts usually contain provisions that bond the future behaviour of the insured. Thus a mis-statement of the consumer's actual level of insurance may invalidate his or her policy. This acts as a constraint on the policy-holder's subsequent actions. These incentive arrangements are substantially diminished by the public funding of most health services. Taxes that are required to fund such services also impose output (deadweight) losses on the community.

Taxation rules exert a powerful influence on insurance markets. A taxation regime that is as neutral as practicable is required to help achieve an efficient level of prevention and insurance. Income tax provisions affecting general insurance, including accident insurance, are not neutral as between insurance and other activities, domestic- and offshore-placed insurance, and as between private and state-owned enterprises. A review of the taxation of general insurance, which was promised in 1988 as part of the reform of disaster insurance, has not yet been completed. Recent taxation changes have focused on specific problems related to reinsurance rather than broader issues. A thorough examination of the taxation of general insurance aimed at achieving as neutral a regime as is practicable should be undertaken.

3.6 CONCLUSION

The key conclusions that arise from the discussion in this section may be summarised as follows:

- the primary role of the government in relation to fire services is to provide a regulatory environment that will encourage the provision of optimal levels of loss prevention from fires, accidents and similar contingencies for which fire services may be required, and appropriate levels of insurance;

- while some regulations aimed at reducing the loss of life and injuries caused by fires are desirable, present arrangements are unlikely to be optimal;

- voluntary investment in loss prevention can be expected to be discouraged by the provision of fire services at a cost that does not reflect the risk involved. There is also likely to be an excessive investment in fire services;

- most fire services do not exhibit the characteristics of public goods. Similarly, externalities do not justify the public provision and funding of fire services;

- firms and individuals would be encouraged to invest in fire prevention and loss minimisation if losses incurred by third parties caused by accidental fires could be recovered from the person responsible and if the ARCIC scheme were reformed;

- a perceived free-rider problem may arise in relation to fire services because the community may not be prepared to allow the normal sanctions for non-payment to apply; and

- the perceived free-rider problem would, at most, suggest government action aimed at enhancing the property rights of private providers of fire services rather than the public provision or collective funding of fire services.

4 THE PROVISION OF FIRE SERVICES

The main argument for the collective provision of fire services on a national basis was the desire to raise standards and to achieve greater uniformity of services in urban fire districts and, to a lesser extent, in rural areas. The public provision of fire services does, however, raise the question of whether providers have adequate incentives to use resources efficiently. This question is examined in this section.

4.1 INCENTIVES FOR THE EFFICIENT PROVISION OF FIRE SERVICES

In the absence of compelling grounds for government action, the provision of fire and related services should, like most goods and services, be provided through a voluntary and competitive market. The advantages of this method of allocating resources to satisfy the desires of consumers are listed below:

- producers of fire services would be encouraged to satisfy the preferences of consumers. The quantity and quality of services provided could be expected to reflect, to a greater extent than currently, the needs of individual consumers. Contrary to the views of some commentators, competitive provision of services on a voluntary basis satisfies minority interests to a greater extent than public provision. Producers are encouraged to seek out profitable opportunities wherever they exist. When resources are allocated through the political process, there is a tendency to produce more uniform services in response to pressure groups, including those reflecting the interests of the providers. The increased diversity of equipment and services following the introduction of competition in the telecommunications and transport industries illustrates this point;

- the value of fire services to consumers is reflected in the prices that consumers are willing to pay. This would provide producers with information on the level of resources that should be committed to the provision of fire services and inform consumers on the relative benefits of fire services, fire prevention and insurance. Superior information could be expected to lead to a better allocation of resources. An essential feature of market mechanisms is that in most circumstances they coordinate and transmit information to actual and potential market participants more completely and accurately than non-price allocative systems (Hayek (1945));

- actual or potential competition among providers of fire services would encourage providers to contain costs and to innovate. Thus the least costly method of producing fire services which meets the needs of consumers would emerge; and

- the need for mandatory levies would be avoided. Mandatory levies distort the preferences of consumers and blunt the information value of voluntary transactions. From a community perspective, mandatory levies waste resources that are devoted to compliance and enforcement.

If fire services were provided on a competitive basis more firms could be expected to provide their own fire services. This would occur where the provision of fire services within the firm enabled production and transaction costs to be minimised. In addition, incentives to prevent fires would be strengthened.

These types of benefits flow from permitting voluntary transactions in a competitive market. If the free-rider problem cannot be controlled in the normal way - that is by denying service to firms and individuals who refuse to pay - then government action to address the problem would be necessary. This would focus on furthering the opportunity for providers to recover costs from the beneficiaries of fire services. Moreover, the perceived free-rider problem relates to essential services, such as the suppression and extinction of fires and the rescue of people endangered by fire, and not to most special services. Thus, even in these circumstances, many of the advantages of market allocation of resources noted above could be obtained.

The provision of fire services is presently subject to little competition. All levy-funded urban fire services are provided by the NZFS. An alternative provider would face a major competitive disadvantage relative to the NZFS. Most industrial brigades are registered with the Commission. The Commission has oversight and administers some funding of rural fire services. It also undertakes regulatory functions, for example under the Building Act and in setting standards for fire brigades to be registered.

There is substantial evidence to support the proposition that competition, including the threat of competition, is beneficial to consumers.[37] The introduction of competition in domestic air and telecommunications services, for instance, has improved the range and quality of services available to consumers and reduced real prices. The advantages of competition and of private sector incentives for better management of businesses have encouraged many governments of all persuasions to reform regulatory arrangements affecting state-owned businesses. Many businesses have been privatised and a range of services that were previously provided publicly, often under monopoly conditions, have been supplied by tender.

Most fire services in countries New Zealand is commonly compared with are publicly provided by local government and funded through local taxation. Career firefighters have generally opposed the introduction of competition in the provision of fire services. There is, nonetheless, evidence from overseas that where competitive provision of fire services has been permitted it has generally been beneficial to the community. This is illustrated below by reference to the experiences of Denmark and the United States.[38]

Denmark

The ratio of the costs of fire services to GDP in Denmark is about half that of New Zealand and the ratio of direct fire losses to GDP is about 20 percent of New Zealand's. In relation to GDP, Denmark's costs of fire services are substantially lower than comparable European countries.

Almost half of Denmark's fire services are provided privately by Falcks Redingskorps (Falck), which is the world's largest private fire protection company. Falck, which was formed in 1906 as a salvage company, began motorised ambulance and fire services in 1908 and 1922 respectively. Fire services were initially provided in rural areas, where there were few services, and were later extended to provincial towns and cities. Falck, which is now owned by a number of insurance companies, has expanded beyond

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37 Winston (1993), for instance, reports that regulatory reforms aimed at enhancing competition in transport, communications, sharebroking and natural gas in the United States produced quantifiable benefits for society of at least US$36-$46 billion (measured in 1990 dollars) annually, amounting to a 7-9 percent improvement in the part of GNP affected by the reforms.

38 The main sources referred to were Kristensen (1983), Guardiano, Haarmeyer and Poole (1992), Simmonds (1989), Poole (1988) and information prepared by Rural/Metro.

Denmark. Its major businesses are fire protection, ambulance services and car towing. Falck is among Denmark's 20 largest employers.

Kristensen (1983) undertook a comparison of Falck and publicly provided fire services in Denmark. Because fire services in Denmark are highly regulated, services provided by Falck and public fire services are similar. For this reason, Kristensen argued that his study provided a good comparison of the relative efficiency of providing services publicly or privately. Kristensen found that private provision was cheaper than public provision:

> The cost difference between private and public provision of professional fire services is next to incredible: 46.3 kr per capita and 131.9 kr per capita, respectively.

Kristensen argued that the following factors contributed to the better cost performance of Falck:

- public provision implies that the scale of production is determined by the administrative unit and not by economy of scale considerations. The relative efficiency of Falck was based on joint production of a number of different services (for example vehicle towing and ambulance services) which enabled personnel to be better utilised. Personnel typically account for around 70 percent of the costs of fire services;

- while Falck has a franchise, it constantly faces the threat of being replaced by publicly provided fire services. This forces it to contain costs and to innovate. Falck's strongest argument for the retention of its present position is that it provides a more economic service than alternative public services; and

- the separation of the "demand articulating unit from the production unit". With public provision, these units are merged. This makes the control of costs difficult and may spark a process of ever-increasing costs because "forces supporting increased expenditures always tend to be stronger than forces backing austerity".

United States

A small number of communities in the United States are protected by private fire services that are provided on a subscription basis or under contract to a local jurisdiction. These services may be found in former rural areas that have developed into unincorporated suburban areas or cities whereas the traditional publicly provided fire department dominates the provision of fire services in established cities. Strong union opposition to privately provided fire services has stopped them from making an inroad into traditional fire departments.

Rural/Metro

The best known private provider of fire services in the United States is the Rural/Metro Corporation, which serves some 5 million people in 50 communities located in 5 states. The company was founded in 1948 in what is now the City of Scottsdale (population 125,000). Rural/Metro provides a wide range of fire services (including fire inspection and prevention, hazardous waste disposal and training related to the handling of hazardous waste), operates emergency medical and ambulance services, home health care services, communication and dispatch centres, and undertakes fleet maintenance. Rural/Metro fire services are operated on a subscription or contract basis.

The Institute for Local Self Government undertook a detailed study of fire protection in Scottsdale and its three similar neighbouring jurisdictions which are served by public fire departments (Glendale, Mesa and Tempe). During 1971-76, the average per capita cost in Scottsdale was US$6.48 compared with US$10.68 in Tempe, US$11.43 in Mesa and US$12.62 in Glendale. Although Scottsdale has twice the land area of the other centres, it had the best average response time of 2.96 minutes, comparable to 3.0 minutes for Glendale and Mesa and better than the 3.8 minutes for Tempe. Scottsdale's fire insurance risk rating (ISO) was class 5, the same as Glendale's but less favourable than Tempe (class 4) and Mesa (class 3). Insurance companies generally charge homeowners the same premium for areas classed 3 to 5, suggesting that the risk difference is not large. In an independent survey undertaken in 1988, respondents voted by a margin of 6 to 1 to retain Rural/Metro's service in preference to establishing a municipal fire department.

In 1969 a further study was undertaken by the University City Science Centre, a Virginian based management and technical consulting firm. Scottsdale had the lowest rate of structure fires per head of population, 39 percent below the average of other cities included in the study. Its fire losses and civilian deaths from fires were 41 and 25 percent respectively below the average, and Scottsdale's cost of fire services per capita was the lowest among the cities included in the study.

Rural/Metro's ability to provide less costly fire services is attributed to the company "thinking smarter" (Poole (1988)). The company relies on a relatively small core of full-time firefighters who are supplemented by trained and paid auxiliary firefighters (for example city gardeners). It can also call up on-duty trained firefighters who are engaged in other activities undertaken by the company.

Rural/Metro pioneered the use of smaller and more economical fire appliances (illustrated by the slogan that "Chrome doesn't put out fires") which are capable of being used with fewer firefighters. These efficiencies are similar to those found by Kristensen (1983) in respect of Falck. Rural/Metro was also the first fire service in Arizona to require all its firefighters to be certified by the state, indicating that economy can be achieved without lowering safety and training standards.

Other Providers

There are a number of other private providers of fire services in the United States. The following illustrate the benefits found in studies of some of them:

- American Emergency Services Corporation provides fire protection services in Elk Grove (Illinois) rural fire district on a contract basis. It also provides emergency medical services. The corporation saved the district an estimated US$2 million in capital costs by avoiding the need to establish a fire department and 33 percent in ongoing operating costs. An independent study in 1981 concluded that the Corporation's experience supports the hypothesis that a private profit-making firm will provide service at a lower cost than a public supplier;

- Lewiston Rural Fire Services is a privately owned subscription fire service. The area covered by the company was previously unprotected. It has promoted fire awareness and fire safety, and incidents reported declined by 60 percent between 1984 and 1989;

- Paramedic Services of Illinois is estimated to save Lincolnwood Village around 20 percent of its operating expenses; and

- Southside Fire Department Inc saves the City of Savannah US$1 million a year in operating costs.

Conclusion

International experience with fire services and New Zealand's experience with other activities suggest that competition in the supply of fire services is desirable to encourage efficiency. Furthermore, overseas experience demonstrates that fire services can be organised on a competitive basis. The introduction of competition is an essential element in reforming the provision of fire services.

4.2 SHOULD PUBLICLY ORGANISED FIRE SERVICES BE ESTABLISHED ON A NATIONAL BASIS?

The first question that needs to be resolved is whether fire services should be organised on a local or a national basis. In a competitive market, the most efficient method of organising services could be expected to emerge and this question would not arise. However, if fire services were to be provided on a contract basis, the issue of whether the organisation of fire services should be a central or local government responsibility must be considered.

Urban fire services are currently organised on a national basis. The Commission functions as an agent of central government. On the other hand, rural fire services are largely organised on a local government basis although the ministers of defence and conservation, who are rural fire authorities, represent central government. In addition, the Commission has some responsibilities for rural fire services.

The general legal principle is that parliament is sovereign in New Zealand. The power of local government to tax, to regulate and to produce goods and services is devolved from central government. Assuming for the moment that fire services were to be organised by the government, the issue is whether central government should devolve that task, or part of it, to local government.

An economic analysis suggests that where the benefits and costs of activities are largely of a local nature they should be devolved to local government and funded at the local level. The local community is best placed to determine the merit of such activities because it is more likely to have access to relevant information and to have stronger incentives to take informed decisions than the wider community. There is also the advantage that marginal location choices of citizens and firms provide some encouragement for local government to be efficient. The higher costs involved in external migration compared with relocating to an area administered by another territorial authority may mean that this incentive is stronger in the case of local government than central government.

Most fire services appear to be of a local nature. Few fires spread beyond the initial property to other properties and most incidents are attended by firefighters assigned to provide protection for the relevant area. The limited examples of fire services being mobilised beyond those serving the affected region cited by Hunn (1982), for instance, generally illustrate this point. Hunn noted that four permanent brigades were mobilised to deal with flooding in Wellington and the Hutt Valley in 1976. He also cited a few occasions on which distant fire brigades or equipment were dispatched to support local firefighters. The chief executive mentioned similar examples to those cited by Hunn, together with a small number of recent incidents, in support of the retention of a national fire service (Cummings (1994)). The view that rural fires are essentially of a local nature was noted by Hensley *et al.* (1989). Moreover, fire services are generally organised on a local government basis in Australia, Japan, United States

and United Kingdom. In addition, the NZBR is unaware of any information that suggests that there are significant economies of scale in the provision of fire services on a national basis.[39]

The driving force for the nationalisation of fire services was the desire to raise and achieve more uniform standards, and to improve training and promotion prospects for firefighters. The benefits of common communication and control facilities have been cited recently. It is doubtful whether nationalisation of the fire service was necessary to achieve all of these goals. Moreover, the costs of nationalisation may have been underestimated. These include the suppression of local preferences, the entrenchment of restrictive labour practices and excessive labour costs, weakened accountability and a funding system that does not necessarily reflect the level and quality of services available to the payer.[40] The 1993/94 independent review demonstrates that these costs have been high. Standardisation may also impede innovation. Furthermore, the multiplicity of local government administration, which was a concern in the mid-1970s, has been addressed to a considerable extent by local government reforms. There are 73 district and city councils compared with the 277 agencies that provided fire services before their nationalisation.

Greater reliance on local government in organising fire services might be criticised on the ground that local authorities may not diligently carry out their responsibilities. This view could be supported by reference to their performance prior to the nationalisation of fire services and currently in respect of rural fire services. The attention which local authorities would devote to fire services would be affected by the incentives which they face. One possibility would be to impose on local authorities liability for fire losses sustained by property owners where the authority neglects its responsibilities. Alternatively, there may also be grounds for organising regular, independent and public assessments of the operational capabilities and effectiveness of local fire services. The possibility of introducing a fire rating system could be examined. These measures could assist in addressing information costs which might otherwise impede monitoring of fire services.

There may also be grounds for charging a regulatory agency with responsibility for establishing and enforcing minimum standards for the provision of fire services and for administering related aspects of fire safety such as water supplies for fire fighting and evacuation procedures. Consistent with current government practice, the agency should not have responsibility for the provision of fire services.

This analysis suggests that the grounds for organising fire services on a national basis are doubtful. The fire services should be organised in a manner that permits the most efficient scale of operation to evolve over time. This conclusion is an important aspect of the proposals developed below.

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39 The NZBR is unaware of compelling evidence from studies on the economies of scale associated with the provision of fire services. The main conclusion is that decisions relating to the jurisdiction of government agencies have largely determined the size of fire services. See Duncombe (1992).

40 It is often argued that competition in the supply of publicly provided services will lead to duplication of management and other overheads. The same argument can be applied to the private sector. The fact that competition does not normally lead to supply by a single firm indicates that any such duplication is at least offset by other benefits.

4.3 OPTIONS FOR THE COMPETITIVE PROVISION OF FIRE SERVICES

There are two ways in which fire services could be organised on a local basis and in a manner that would enable the benefits of competition to be realised while acknowledging the perceived free-rider problem. These are as follows:

- for each territorial authority to tender the right to supply fire services for its jurisdiction; and

- for the competitive supply of fire services to be permitted. Under this option fire service providers would be able to market their services.

These options are described below.

Under each option, central government would establish an appropriate regulatory framework for the following:

- fire safety legislation (for example the Building Act), including provision for the optimal enforcement of regulations. As argued above, the government should provide minimum standards aimed at preserving life, the avoidance of personal injuries and the minimisation of fire losses by neighbouring property owners, having regard to the costs and benefits involved;

- fire service standards. The government should prescribe standards for fire services. This requirement arises as a consequence of the free-rider problem. If the government intervenes to address the perceived free-rider problem by providing compulsory subscription for fire services, incentives for determining the classes, level and quality of services to be provided would be diminished. In the absence of minimum requirements, a poor service could be offered for little charge just to meet the requirement to subscribe. This problem may be overcome by setting minimum standards for fire services. The classes of services to be provided would be restricted and would not include services for which a free-rider problem does not arise (for example spills of hazardous materials and water evacuation);

- funding of fire services. The perceived free-rider problem leads to the view that the government should enable the providers of fire services to recover the costs of those services from the beneficiaries. Methods of funding fire services are examined in section 5;

- civil defence. The organisation of civil defence is assumed for the purposes of this report to remain a central government function. No change in the general role of the fire services in civil defence has been considered. Funding of civil defence activities undertaken by fire services is considered in section 5;

- national fire safety programmes. To the extent that such programmes are a valid function of central government, they should be organised as part of the government's public health and accident prevention programmes and should be funded accordingly; and

- fire protection for government owned property. The government should generally take steps to protect its property on a similar basis to prudent private property owners.

These roles of central government conform with its regulatory and ownership interests. Aspects of each role are presently undertaken by central government.

Tendering the Right to Supply Fire Services

Under this option, territorial authorities would generally be responsible for arranging the provision of fire services. Each authority would negotiate contracts for the supply of fire services with potential providers. The classes, level and quality of services to be provided would be determined by each authority but would at least meet the minimum standards set by central government. A territorial authority would be able to set higher standards and contract for a wider range of services than those specified by the government. One or more suppliers of fire services would be contracted to provide fire protection within the jurisdiction of each authority.

Territorial authorities may wish to provide fire stations, leaving suppliers of fire services to arrange for appliances, personnel and other inputs. They could enter into a mutual aid agreement with neighbouring authorities to augment resources in the event of a large fire or similar emergency. The supplier of fire services may offer similar services to more than one authority.

The advantages of this approach relative to present arrangements are as follows:

- the drawing up of a formal contract for the supply of fire services would require each local authority to focus on the range, level and quality of services required. This would assist in clarifying service requirements and would lead to better measures of the performance of fire services;

- competitive tendering of services would provide incentives for suppliers of fire services to lower costs, to improve quality and to innovate. It would encourage new suppliers to enter the market;

- suppliers of fire services would be able to exploit any economies of scale by competing in more than one area. The size of firms supplying fire services would tend to depend on the economies inherent in the provision of services rather than on administrative decisions. Suppliers of fire services would also be able to reap benefits from the joint production of fire and other services. These cost reductions would be passed on to consumers through the competitive process;

- the costs of local services would be able to be imposed on local property owners and other beneficiaries through rates and user charges, thereby enhancing efficiency. Local property owners would be better represented in the decisions affecting the costs of fire services. This would improve accountability and lead to better trade-offs between the costs and benefits of fire services; and

- fire services would be organised on a local basis in line with the views of firefighters reported by the internal review (Summers and Dudfield (1994)).

The main disadvantages of this option, compared to a fully competitive market for fire services, are as follows:

- territorial authorities may have insufficient information to make optimal decisions on the appropriate classes, level and quality of services. With a strong element of compulsion, arising from the need to address the perceived free-rider problem, most property owners would not be permitted to decline to pay for services. Thus the normal market mechanism for informing suppliers whether their services are desired by consumers would be substantially weakened; and

- the incentives for elected representatives to monitor fire services and to make optimal decisions would be limited. Elected representatives tend to reflect the interests of the median voter. Because the benefits from monitoring elected

representatives are thinly spread, voters have weak incentives to monitor their actions. These factors are likely to lead to less efficient services than would be the case in a fully competitive market.

Despite these disadvantages, this option is preferable to present arrangements, especially for urban fire services where there is little competition and even weaker incentives for appropriate monitoring of the Commission and the NZFS (see section 6).

Within this option, there would be grounds for some rural fire services to continue to be provided directly by territorial authorities. This might apply where the costs of negotiating contracts outweigh the likely benefits, for instance where fire services are provided on a volunteer basis and where equipment and services are limited. In these circumstances, provision of fire services by the territorial authority should be permitted provided that ratepayers agree.

The adoption of a territorial-based tendering option would involve major change to the organisation of urban fire services but limited change to most rural fire services. The regional and national administrative structure for the supply of urban fire services would be dismantled. Significant changes to this structure are being implemented following the chief executive's review. The NZFS would need to be established on a commercial basis so that fair competition between it and other suppliers could emerge.

Competitive Supply of Fire Services

An alternative approach which helps address the problems identified above would be to permit competing fire services to develop but to require property owners to subscribe for the fire service of their choice. Under this option, providers of fire services could enter the market provided that their services meet certain minimum standards. The survival of suppliers would depend on their ability to gain subscriptions and to provide quality services on a cost effective basis. Fire service suppliers would be able to charge for additional services.

In the case of an emergency, the property owner would normally call the service to which he or she had subscribed. Automatic alarms, for example, would be connected to the fire service to which the property owner subscribed. Dispatch procedures would also need to identify the appropriate fire service. If an alternative fire service attended an incident it could be replaced by the property owner's preferred fire service on its arrival. There are similar rules governing the attendance of the NZFS at rural fires. Provision would need to be made for the recovery of costs arising from fighting fires affecting properties protected by another fire service. These provisions would be similar to those applying in the insurance industry, for example where one car owner damages another car that is insured by a separate firm.

This approach would provide strong incentives to:

- provide the classes, quantity and quality of services for which consumers are willing to pay. This would include the provision of services which reflect the preferences of minority groups;
- minimise costs and innovate; and
- exploit economies from complementary production of other goods and services and an appropriate scale of operations.

The advantages of this option, compared with the previous one, are as follows:

- a direct relationship between the consumer and the supplier of fire services would improve the responsiveness of the latter to the demands of consumers;

- the information difficulty which local authorities would face in determining the amount of resources to be devoted to fire services would be reduced substantially as consumers would be able to express their preferences through their willingness to contract with competing suppliers; and

- direct competition for the supply of fire services would provide stronger competitive pressures than contracting for the right to supply.

The main disadvantages of the competitive supply option include the following:

- provision would need to be made for cost sharing between competing fire services in circumstances where one fire service attended a fire in property that was protected by another service; and

- compulsory subscription for the supply of services would necessitate procedures to enforce compliance and diminish incentives relative to a fully competitive option.

Given the perceived free-rider problem, this option would lead to the most efficient provision of fire services in most cases. An exception would be where fire services are modest and are provided on a voluntary basis. In this case, territorial authorities may be able to organise fire services more efficiently.

Proposals Common to Both Supply Arrangements

- *The Right of Property Owners to Provide Fire Services*

Under both options, property owners should be able to provide their own fire services (including contracted services), provided that the minimum standards set by the government were met. This would enable firms to arrange for the protection of large industrial plants, but should not be limited solely to such plants. It would provide greater competition in the supply of fire services and would encourage more efficient decisions relating to fire prevention, fire losses and fire protection. The question of whether a firm meets the standards specified should be decided by an independent regulatory authority.

- *Fire and Other Incidents Related to the On-road Use of Motor Vehicles*

A possible variation on the above options would be for fire and related rescue services related to on-road use of motor vehicles to be organised as part of the land transport system - Transit New Zealand (state highways) and territorial authorities (local roads) - or the Police. This approach might enable the costs of attending to motor vehicle incidents to be identified and charged to motorists through the motor vehicle registration system.

- *The Provision of Special Services*

The NZFS provides a range of special services. One question that needs to be addressed is whether such services should be provided under the options examined above. The NZFS's policy of providing most special services without direct charge to the user can be expected to discourage other suppliers. The most efficient producer of such services is unlikely to emerge under current arrangements. The rescue of motorists from their vehicles where fire is not involved, for example, may well be a service that

tow truck operators could offer with appropriate training, at least in the main urban centres. Most special services, where life is not endangered would not be included in the minimum level of services required to be provided.

Under the tendering option, territorial local authorities would decide the range and extent of special services to be provided by fire services or other providers. In the case of the alternative option, where competitive supply of fire services is permitted, suppliers would determine the range of services to be provided in response to perceived market opportunities. Providers other than fire services would be able to compete, if funding arrangements were not restrictive (for example if the costs of particular services can be recovered from users). This would enable the most efficient arrangements for the provision of special services to emerge. This approach would also enable fire services to supply other emergency services (for example ambulance services) if that were commercially attractive.

4.4 IMPLICATIONS FOR THE COMMISSION

The present structure of fire services would impede the introduction of competition through tendering by local authorities or by open entry into the market for fire services. The Commission is not required to operate on a commercial basis. It is not, for instance, required to earn a return on its capital, it does not pay income tax and it is partly funded on a cost plus basis. The Commission and the NZFS would need to be organised on a commercial basis if either option were to succeed.

A transition programme from the present structure of fire services would need to be put in place with the early introduction of competition based on neutral funding. The option of allowing firms to arrange their own fire services should also be introduced at the beginning of the transition programme.

4.5 CONCLUSION

The introduction of competition in the provision of fire services is essential to promote efficiency. Economic analysis suggests that if the provision of fire services is to be organised publicly, it should be arranged on a local basis. There are two broad approaches aimed at introducing greater competition:

- the obligation to organise fire services could be devolved to territorial authorities. Each territorial authority would generally be required to tender the right to provide fire services within its territory; and

- suppliers of fire services would compete for custom.

Under both options, firms meeting minimum standards of fire protection would be permitted to provide their own fire services. The second option is likely to be the most efficient except in rural areas where fire services are limited and provided by volunteers.

5 FUNDING FIRE SERVICES

In this section, the funding of fire services is examined. Present funding arrangements are evaluated and the impact on them of reforms to disaster insurance is noted. Alternative funding possibilities are examined. The advantages and disadvantages of addressing the perceived free-rider problem by regulation requiring property owners to subscribe for fire services and by funding fire services through rates or general taxation are discussed.

5.1 ANALYSIS OF PRESENT FUNDING ARRANGEMENTS

The Commission is currently funded by a levy on fire insurance firms, by a grant from the government and by minor user charges and other income. The levy accounts for 92 percent of the Commission's costs while the government's grant accounts for most of the balance.

In the absence of a perceived free-rider problem, fire services could be provided voluntarily on a fee for service or a subscription basis. The method of funding would be decided by the provider and competition would lead to the evolution of the most efficient method or methods of funding (Alchian (1977)). It would be possible for both methods or a combination of methods to emerge as consumers' preferences would not necessarily be the same.

If the perceived free-rider problem is sufficiently serious then, as in the case of lighthouses in eighteenth century England, government action may be justified to reinforce the property rights of fire service providers. The question that needs to be examined is whether the present method of funding fire services is likely to be an optimal solution to the perceived free-rider problem.

As the lighthouse example shows, the principle of linking the funding of fire services to a closely related service may be an appropriate response to a free-rider problem. The principle of funding fire services by imposing a levy on insurance firms cannot be dismissed just because the levy constitutes a tied or selective tax as some commentators have suggested. The issue, however, is whether present arrangements are more efficient and equitable than feasible alternatives.

There are grounds for arguing that the present levy scheme, which is relatively simplistic, is inappropriate. The main deficiencies of the scheme are as follows:[41]

- the rate of levy is unrelated to the risk of fire associated with each class of property because a flat rate levy is payable. The trade-off among fire prevention, fire services, insurance and fire losses is consequently distorted. This is not simply a question of the relative amount of levy paid by rural and urban or commercial and residential property owners. It is a deeper issue related to the assessment of fire risk for each class of property. Activities associated with a relatively high fire risk (for example sawmilling) are subsidised by other activities (for example accountancy services).

41 The analysis presented draws on Mark (1983).

In an otherwise unconstrained market, firms would invest resources to assess fire risks pertaining to each class of property up to the point where the marginal return on those resources just equalled the incremental cost involved. Implausible conditions would be necessary to suggest that the optimum outcome would be to devote no resources to such assessments and to place all property in a single risk class as at present;

- the rate of levy is unrelated to the level of service required to protect life and property should a fire occur. This point is related to the previous one. While the risk of a fire occurring is one factor, the intensity of effort and the equipment required to extinguish it and to rescue people are also relevant. Unlike a fire in a single storey residential dwelling, a fire in a high rise office or an industrial building might require aerial equipment. Similarly, the number of firefighters required to extinguish fires differs from situation to situation. Fires in buildings with a high degree of fire protection, such as the almost 5,000 buildings with sprinklers installed, would require fewer firefighters than those in other buildings. The present levy penalises owners of property in which fires could be relatively easily extinguished and subsidises owners of other buildings;

- the rate of the levy is unrelated to the quality of the fire services available to particular property owners. Because the levy is a flat rate one, property owners bear the same cost for each dollar of insurance purchased regardless of the level of service available. Thus a rural property owner who is unprotected by an urban fire service, or is a long distance from such a service, pays the same fee as the owner of a similarly insured property located next to a fire station. The argument advanced by Hensley *et al.* (1989) that rural property owners do not subsidise urban fire services because rural buildings are generally of lower value than urban buildings is invalid. It is the value of property which normally determines the extent to which resources should be committed to protecting it from fire;

- the levy discriminates against communities that are largely protected by volunteer fire services. The real cost of such services is borne by volunteer firefighters (forgone employment and leisure which are compensated, at least to some extent, by the private benefits which they gain from serving their communities), their employers (where the income of volunteers is not adjusted) and the community (fund raising). The members of such communities effectively pay twice for fire services;

- personnel costs account for more than 70 percent of the Commission's total costs. These costs mainly arise in respect of career firefighters who are employed in larger urban areas. The direct costs of fire services for other areas are lower because they rely on volunteer firefighters. The levy scheme subsidises large urban centres with career firefighters relative to smaller areas that rely on volunteers;

- uninsured and under-insured property owners are subsidised by other property owners and taxpayers. This is an example of free-riding. The costs of preventing all free-riding would be excessive. In the lighthouse case, ships that benefited from the services of lighthouses but by-passed ports in the United Kingdom did not contribute to the cost of lighthouses. In the case of fire services, the problem is accentuated by the minimal use of user-charges. Harrison *et al.* (1994) reports a survey that found that between 2 and 2.5 percent of domestic buildings were uninsured and that 11 percent of households did not insure household contents. These rates of non-insurance are surprisingly low. The level of under-insurance is unknown but is understood to be the main problem;

- the levy is unrelated to the use which is made of fire services. Property owners who use fire services pay the same fee as non-users, aside from minor user charges. Many insurance contracts provide discounts if no claims are made. These help to control moral hazard and adverse selection problems, and they encourage loss prevention. The introduction of user charges for false alarms arising from equipment failure is intended to encourage firms to maintain their equipment to a higher standard than otherwise. For similar reasons, an optimal fire service charge is likely to involve a more significant use-related element than currently;

- the demand for fire insurance is distorted by the levy. A levy unrelated to the factors identified above could discourage the purchase of insurance, or bias the amount of insurance purchased. This is particularly the case given that the levy amounts to around 22 percent of average premiums. If the levy were optimal in relation to the fire service required to protect each class of property, it would not unduly distort the purchase of insurance;

- the allocation of costs between the government and property owners is unlikely to reflect the relative costs of providing fire services in respect of government property. The government tends to self-insure its property (for example school buildings). While privatisation and corporatisation have reduced the amount of uninsured property owned by the Crown, it is probable that the decline in the government share of costs since 1975 has been excessive. In addition, the Crown's contribution is intended to cover the costs of providing fire services for uninsured property. To the extent that the levy is excessive, it amounts to a highly selective tax. Such taxes are recognised as being among the most distorting taxes imposed by governments; and

- the levy finances special services which are provided by the NZFS at the expense of insured property owners. The protection of life may fall into this category. In this case, there may be a closer link with life insurance (mortality risk alone), the ARCIC scheme and health insurance than with fire insurance. Hazardous substance emergencies, water evacuation and emergency medical calls may be only loosely related to fire insurance.

This analysis suggests that the present levy arrangement falls short of an optimal response to any perceived free-rider problem. Excessive subsidies and penalties apply to particular consumers. The potential efficiency costs, which arise from the distortion to investment in loss prevention, insurance and fire services, are likely to be substantial. There is a need to relate the price charged to consumers for each class of service more closely to the cost of its provision. In any event, as explained later, a change to the levy arrangement is required following the introduction of competitive supply of disaster insurance, to reflect the level of risk in disaster insurance premiums and to move away from indemnity value as a base for such insurance.

5.2 IMPACT ON FUNDING OF DISASTER INSURANCE REFORMS

Under the disaster insurance policy adopted, following a review of the earthquake and war damage scheme, it is expected that indemnity values will cease to be widely used for insurance purposes. Fire insurance has been progressively moving to a replacement value basis and the disaster insurance reform is based on a similar approach.

If indemnity values were to be retained solely for the purposes of calculating the levy, purchasers of insurance would be encouraged to understate the indemnity value of their property, thereby reducing the cost of the levy. Previously, if the indemnity value were understated the insured would face lower earthquake, war damage and fire cover. This disadvantage provided some incentive for purchasers to state accurately

the value of their property. The retention of indemnity values solely for the purposes of collecting the levy would also increase compliance costs.

A working party comprising officials from Internal Affairs and Treasury, representatives of the Commission and the insurance industry, and an independent chairman, was established to examine the levy collection mechanism (Harrison *et al.* (1993)). The working party was unable to reach a consensus. The Commission argued that the present levy arrangements should continue. The Insurance Council opposed the continued collection of the levy along with insurance premiums. It argued for the funding of the fire services from general taxation, a view that had previously been advocated by Mark (1983) and Strategos (1989).[42] The Corporation of Insurance Brokers accepted that the levy could be collected through insurance.

The working party, other than the Commission, concluded that the indemnity system should only remain until an alternative collection mechanism could be put in place. It rejected the concept of a tax on all premiums because it would be inequitable. The working party decided that the proposal to fund the Commission from general revenue was beyond its terms of reference.

A majority of the working party proposed the following funding arrangements:

- commercial and public sector property:
  - the levy to be assessed on the full value of the insurance policy (that is, replacement value except where claims settlement is on an alternative basis in which case the declared indemnity value would continue to apply);
  - a discount would apply for property (including contents but excluding vehicles) protected by approved sprinkler systems or approved private fire brigades which provide 24 hours, 365 days a year protection;
  - Internal Affairs and the Corporation of Insurance Brokers recommended that the amount of the discount be either 40 percent coupled with continued service from the Commission free of charge or 75 percent together with Commission assistance on a fee for service basis. The Commission argued for a maximum discount of 30 percent as a higher discount would lead to a large increase in sprinklers, thereby necessitating a reduction in expenditure by the Commission or a rise in the rate of levy. The Commission was also opposed to a user-pays option; and
  - commercial forests would remain exempt;
- domestic buildings and contents:
  - in respect of buildings, the levy to be calculated on the value of improvements as assessed by Valuation New Zealand;
  - in respect of contents, the levy to be assessed on the sum insured; and
  - the discount for approved sprinklers would apply; and
- private vehicles:

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42 Mark (1983) examined the apportionment and verifiability of fire premiums in situations where insurance contracts covered more than one contingency. Mark concluded that the existing collection system could not be sustained. The government agreed with this conclusion but rejected his recommendation that the Commission be funded from general taxation or a tax on all insurance premiums.

- the levy would be a fixed charge depending on the age of the vehicle starting at $20 and declining to $5 for eight year or older vehicles.

The working party acknowledged that fire risk should be reflected in levy arrangements but it made only a tentative move in this direction. It also reported pressure from interested parties for the Commission's expenditure to be reduced. The report provided little discussion on the basis or rationale for differential treatment of property. For instance, the grounds for the level of the discount for sprinklers are understood to have been arbitrarily determined.

Because the changes to the Earthquake and War Damage scheme affecting commercial property applied from 1 January 1993, the government acted on an interim report from the working party. The owners of commercial property were required to sign a declaration confirming the accuracy of the indemnity value of their property or provide a valuation by a recognised valuer. The indemnity value continued to be the base for the levy.

A further interim change was enacted in 1993. Property, other than commercial property, has been subject to the levy on the following basis since 1 January 1994:

- the replacement sum insured with the Earthquake Commission (the successor to the Earthquake and War Damages Commission) for domestic buildings (up to $100,000) and contents (up to $20,000); and

- a flat rate for motor vehicles not exceeding 3.5 tonne gross laden weight. The levy will only apply to motor vehicles that are insured for loss from fire.

A decision on the working party's main recommendations has not been taken. A further report was commissioned on the relationship between indemnity and replacement values, the implications of providing discounts and the effect on revenue of the 1993 legislation. The report estimated that a levy of 4.1 cents per $100 of replacement value or sum insured of commercial property would yield the same revenue as a levy of 6.2 cents per $100 of indemnity value, leaving aside the proposed discounts (see Harrison *et al.* (1994)). It was estimated that 5.75 percent of non-residential properties would qualify for the discount available in respect of buildings which are fitted with sprinklers. An increase of between 0.1 and just over 0.2 cents per $100 would be necessary to offset the revenue lost from the discount.

The final report of the working party was submitted in 1994 (Harrison *et al.* (1994)). The working party confirmed its initial proposals with some tighter wording. The collection of the fire service levy on insured property other than residential property and motor vehicles would be assessed on replacement value where the contract of insurance provides for claims to be settled on a full or partial replacement basis. Where claims for non-residential property are settled on some other basis, the levy is to be assessed on indemnity value or the sum insured, whichever is the largest. It was recommended that all motor vehicles pay the levy at a uniform rate irrespective of the weight or use to which the vehicle is put.

The working party was not charged with a first principles analysis of the funding of the Commission. However, such a study is required to address properly the deficiencies of the present levy scheme.

5.3 ADDRESSING THE PERCEIVED FREE-RIDER PROBLEM

The shortcomings of present funding arrangements could be substantially reduced by permitting the following factors to be better reflected in charges for fire services imposed on property owners:

- the classes of service provided by fire services;
- the optimal method of imposing the costs of each class of service on relevant beneficiaries;
- the likelihood of particular classes of consumers using the service and the level of service required; and
- the level and cost of service provided to property owners and other beneficiaries in particular areas.

If fire services were provided on a competitive basis, similar to most other goods and services, charges would adjust to reflect the above factors. Fire and related services would then be priced on a similar basis to insurance. This would:

- provide better incentives for loss avoidance because the real costs of fire services would more likely be imposed on individuals and firms that require the service;
- encourage firms and individuals to take better decisions relating to self-provision of fire protection (for example the installation of sprinklers and the establishment of industrial brigades);
- facilitate competitive provision of fire services; and
- provide superior information on the costs of particular services and thereby permit better decisions on the level of resources to be provided and on their disposition by fire services.

This approach would involve greater administration and compliance costs than the present flat rate levy. The key issue, however, is the adoption of arrangements which enable total output to be maximised rather than to minimise administration and compliance costs alone. Firms in other industries do not charge a flat rate for widely different classes and levels of service despite the higher administration costs involved with differential pricing. This provides compelling evidence that an optimal balance between transaction and production costs has not been achieved in respect of fire services.

A Regulatory Approach

The perceived free-rider problem could be addressed if the government required property owners to subscribe for fire services of their choice and enabled fire services to recover subscriptions and user charges from property owners and other users. It would also be necessary to arrange for a fire service to recover the costs of fighting fires in property protected by another fire service. Property owners would determine which fire service should protect their property. This approach addresses the perceived free-rider problem without unduly restricting competition in the supply of fire services.[43]

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43 The licence fee payable to New Zealand on Air, which meets certain costs related to radio and television broadcasts, is the closest parallel to the approach suggested for fire services. This fee reflects, in part, a perception that radio and television broadcasts give rise to a free-rider problem.

The classes, quality and quantity of fire services provided by each supplier would be agreed between the supplier and the consumer, subject to the requirement that the government's minimum standards were met. The price of services would not be regulated, thus reducing the potential for cream skimming.[44] This would also enable efficient pricing mechanisms to develop.

The government would need to provide procedures for ensuring that property owners subscribe for fire services and meet user charges, at least for a minimum level of service. The primary obligation to subscribe for fire services should be placed on property owners. Significant penalties for non-compliance should be provided. The higher the level of penalties and the higher the risk of being apprehended, other things being equal, the lower the level of non-compliance.[45] Consideration could also be given to the possibility of unpaid subscriptions and user charges constituting a preferential charge on property and insurance proceeds. In a competitive environment, providers of fire services would also have incentives to ensure that property owners subscribe for services.

Specific provision would also need to be made to facilitate the enforcement of compulsory subscription for fire services. In the case of on-road use of motor vehicles, owners could be advised of competing providers and their costs as part of the motor vehicle registration scheme. Motor vehicle owners could be required to nominate a fire service provider with the subscription being collected along with the annual registration fee. This collection mechanism is the same as that which currently applies, except that the cost could vary and there would be provision for competitive supply of fire services.

The same procedure would be feasible if territorial authorities and Transit New Zealand were to tender the right to supply fire and rescue services in respect of on-road use of motor vehicles. These entities would set a schedule of charges which would be payable by motor vehicle owners. Charges should vary according to the risk involved.

A more elaborate system of enforcing subscriptions and user charges would be required in respect of property other than motor vehicles. The essential problem is to identify the range of property that may catch fire or otherwise require the use of fire services. Because the risks involved need to be assessed to improve the efficiency of charging mechanisms, a two-stage approach is desirable. The first stage is to identify property owners while the second stage is to assess the risks involved and to collect subscriptions.

One approach would be to relate the enforcement of subscriptions and user charges for fire services to the ownership of land and buildings. Information on the ownership of such property, which is collected by Valuation New Zealand for rating and other purposes, could be used to identify property owners. Each year, owners of land and buildings could be required to state their preferred supplier or to provide evidence that self-provision of fire services had been approved. This information could then be passed by a regulatory agency to the nominated fire service for matching with its

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Technological advances are, however, diminishing the strength of this argument in the case of the broadcasting industry. An example relating to safety is the requirement for motor vehicles to hold a vehicle inspection certificate. Inspections are provided on a competitive basis and enforcement is facilitated by a requirement to display the prescribed sticker.

44 If prices or services were strictly controlled, producers would be encouraged to serve low risk customers only. They could be expected to develop imaginative ways of identifying preferred customers.

45 For an economic perspective on the optimum enforcement of laws see Becker and Landes (1974).

subscription list. Providers would need to be registered for this purpose but this should not become a significant barrier to entry into, or exit from, the industry.

The nominated fire service could be expected to assess and collect subscriptions from property owners in respect of all property owned by the land or building owner, other than registered motor vehicles, and all property normally contained within the buildings. Land and building owners would in turn be permitted to pass the costs involved to tenants, as is normally the case for rates on commercial buildings.

The nominated fire service could be responsible for the costs of protecting all property, other than motor vehicles, of the land owner. The costs of protecting property that escaped the scheme should fall, in the first instance, on the regulatory agency where its procedures were at fault and on the nominated fire service if it failed to act on the notification of the regulatory agency.

The advantages of this approach are as follows:

- competition for the supply of fire services would be facilitated; and
- more efficient pricing structures would emerge.

Rates

An alternative would be to fund urban and rural fire services from rates. Rural fire services are largely funded through rates at present. The case for this approach would be strengthened if fire services were to be organised by territorial authorities. The rating system is based on property values. Thus there is a link, albeit a weak one, between the rateable value of property and the benefit received from fire services. Harrison *et al.* (1993) recommended that the fire service levy should, in the case of domestic buildings, be applied to the value of improvements.

Rates, however, have many of the properties of selective taxes. They are generally an undesirable method of funding fire services. The following specific disadvantages would arise:

- while the value of property is one relevant element in charging fire services, other factors (such as the risk of fire and the level of fire protection) need to be taken into account to provide appropriate incentives for the avoidance of fire losses;
- rates are imposed on different bases by territorial authorities. In most cases the capital value system is used under which rates are levied on the market value of land and buildings. Land values would not necessarily be closely related to the demand for fire services; and
- rates would be an inappropriate basis to fund special services provided by fire services as the demand for such services is likely to be only loosely related to the value of property.

For these reasons, rating is not generally an appropriate method of funding fire services. In particular, rates should not be used to finance a national fire service as this would provide weak incentives for fire services to operate efficiently. Elected officials would have little or no influence on fire service expenditure and could not be held accountable for the burden which would be imposed on ratepayers and the fire service would not be accountable to ratepayers.

In rural areas rates may be a desirable method of financing fire services (other than those charged directly to property owners who are responsible for fires) where:

- the level of fire service provided is modest and is largely provided on a voluntary basis; and

- the risk of fire and the level of protection provided by firms and individuals are broadly similar (for example in the case of a predominantly farming district).

The marginal benefits of better incentives for fire prevention from a more precise pricing system could be expected to be outweighed by the additional administrative costs involved in these circumstances.

General Taxation

The proposition that fire services should be funded from general taxation has been advanced in some reports (for example Strategos (1989)) and by commentators. The main argument is that fire services exhibit significant characteristics of public goods and services. As argued above, a contemporary analysis of the public goods argument suggests that fire services should not generally be funded from taxation. Another argument is that expenditure on fire services should be weighed against other expenditure proposals. This argument is predicated, however, on the view that fire services cannot be funded privately. As argued above, this view is invalid.

The funding of fire services from general taxation would:

- provide weak incentives for individuals and firms to economise on the use of fire services. As the cost of fire services would be borne by taxpayers in general, the cost imposed on users of the service would be small relative to the actual cost imposed on taxpayers as a whole. This would weaken incentives to prevent fires and would encourage excessive use of fire services;

- increase the deadweight cost of the tax system. All taxes distort behaviour and thereby impose costs on the community in addition to the revenue that is raised. The extent of these efficiency costs has contributed to the movement toward lower marginal rates of tax among OECD member countries. Voluntary user charges, which reflect the value of services provided, do not impose deadweight costs. Compulsory charges may have a similar effect to general taxation to the extent that consumers would not voluntarily acquire the services at the set price. This effect would be modest if the level and price of services provided are close to that which most individuals and firms would otherwise wish to acquire. Opting out provisions such as self-provision, as suggested above, are desirable on these grounds;

- require the level of resources allocated to fire services to be determined by the political process. Providers tend to seek additional resources rather than to improve efficiency and their incentives to minimise costs are diminished. Political decision makers have insufficient information to make informed decisions on the level of resources which should be committed to the service; and

- provide little information on the preferences of consumers. Unlike user charges, when goods and services are funded by taxation little information is conveyed to the suppliers on their real value to consumers. This impairs the ability of suppliers to respond to the wishes of consumers. In addition, inadequate information is produced on the cost of servicing particular classes of clients and on alternative means of achieving objectives.

  These points are illustrated by the comment of a former minister of internal affairs that a particular proposal to fund fire protection for commercial property

by way of user charges "presupposes that the Fire Service is in a position to provide comparative data on the costs of fighting fires in a variety of diverse building structures. There is no evidence that such data currently exists or indeed that it could be readily provided."[46] This position can be contrasted with a comment by Rural/Metro that to remain profitable and competitive it was required to measure and monitor things that municipal fire departments never do.[47]

These disadvantages substantially outweigh any advantages in terms of simplicity that might be perceived to arise from funding fire services from general taxation. There is no convincing reason for believing that a general taxation approach would be superior on efficiency and equity grounds to the levy scheme.

Civil defence activities and general programmes aimed at promoting fire safety (to the extent that they are justified) may, however, be appropriately financed from general taxation. The beneficiaries of such programmes are widely dispersed and it does not seem feasible to impose the costs on them other than through general taxation. These programmes involve a modest cost.

5.4 CONCLUSION

The principle of funding fire services by imposing a levy on insurance firms cannot be dismissed simply because the levy constitutes a tied tax or a selective tax. The chief weakness with the present levy arrangement is that it involves excessive cross subsidisation, thereby biasing choices among fire prevention, fire losses and fire services.

On efficiency and equity grounds, the best way to address the perceived free-rider problem is to require property owners to subscribe for fire services but also to provide the maximum possible scope for competition in the supply of services. In limited circumstances, such as in rural areas where fire services are modest and largely voluntary, it may be desirable to fund fire services from rates as at present. The funding of fire services from general taxation is likely to be less efficient than the present levy scheme.

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46 See Lee (1992).

47 Rural/Metro is a private United States fire and emergency service company - see section 4.1.

6 THE FIRE SERVICE COMMISSION

In this section, the activities of the Commission and the NZFS are examined with the objective of suggesting improvements that could be made in the short term to enhance the economic efficiency of fire services. The section proceeds on the assumption that existing institutional arrangements for the provision and funding of fire services are retained. This contrasts with sections 4 and 5 where the benefits of adopting alternative arrangements for the provision and funding of fire services were examined.

6.1 ACCOUNTABILITY, REPORTING AND MONITORING

The Commission is a Crown entity that undertakes commercial and regulatory activities. Crown entities are any body or statutory officer named or described in the fourth schedule of the Public Finance Amendment Act 1992. They are legally separate from the Crown but the degree to which they operate independently is normally defined in their enabling legislation.

Under the Fire Service Act 1975, the Commission has specific power to control the NZFS, to fulfil its role as the National Rural Fire Authority and it is required, as a matter of prime importance, to take an active and coordinating role in the promotion of fire safety. The Commission is required to perform such functions for the purpose of the Act as may be prescribed from time to time by order-in-council. There are no such orders-in-council in effect. The Commission has a general power to carry out its functions. It is required to comply with all directions given in writing with respect to government policy.

The Commission faces inadequate accountability arrangements. The government has not defined clearly its policy in respect of fire services, with the possible exception of fire safety. The establishment of key parameters for the services to be supplied, such as response times, has been left to the Commission. If, for the sake of argument, the government were to buy fire services from an independent producer on a commercial basis, it would require a more precise specification of the services that are to be provided than that which currently applies in respect of the Commission. It might be argued that the Commission is responsible for policy only and that other functions are better defined in the Act as the responsibilities of the NZFS and its personnel. This is an insufficient response, however, as the accountability of the NZFS to the minister of internal affairs is through the Commission. Moreover, it is inconsistent with the approach taken in respect of fire safety and many other government activities. Because the required outputs are not adequately specified, the Commission's performance is difficult to assess.

The Commission undertakes regulatory functions (for example the tendering of fire safety advice in terms of the Building Act 1991 and Fire Service Act 1975, and registration of industrial fire brigades) as well as service delivery functions. There has been a move toward separating these classes of activities in respect of other government operations to permit better monitoring of performance and to advance competition in the delivery of services.

Because the Commission is largely funded by the levy, its activities may not have been subject to as much scrutiny by the government and parliament as would have been the case had it been financed from general taxation. This was one reason advanced by Strategos (1989) and, recently, by officials for recommending that fire services be funded from general taxation. Moreover, market disciplines that would be more

effective in encouraging efficiency are blunted by the privileged competitive position of the NZFS, mandatory funding arrangements and the restricted application of user charges.

A further indication that the affairs of the Commission are inadequately scrutinised by the government is provided in the 1993 report of the Ministerial Review of the Fire Services. The review, which was undertaken by the then minister of internal affairs and David Harrison, who acted as an assistant and consultant, was signed by the minister alone (Lee (1993)). While the seven page report noted some aspects of the fire services that should be re-examined by the Commission, it was superficial, lacked urgency and failed to address adequately the concerns interested parties have raised in the recent past. The 1993/94 internal review (see section 2.3) showed that inadequate monitoring had allowed significant deficiencies in management, organisation structure and cost control to develop.

The approval of the Commission's estimated expenditure by the government is critical to the control of the Commission. The Commission may borrow to fund any expenditure which is included in its approved estimates. As a consequence, the levy and the Crown contribution do not necessarily constrain the Commission's expenditure, at least in the short run. This is illustrated by comments reported in the media that the reduction in the Commission's 1993/94 budget would be partly made up by increased borrowing. Moreover, in each financial year income comprising the Crown's contribution and the levy is required to be paid to the Commission to meet the actual expenditure of the Commission.

The chief executive of the NZFS is required to consult with the Insurance Council on its expenditure at least once a year. Insurance industry representatives report that such consultations are inadequate to monitor the performance of the Commission. Under previous arrangements, insurance and ratepayer representatives participated in the management of fire services. The former representatives face better incentives to ensure that the level of fire services is related to the expected saving in life, injuries and property losses than the government or the Commission.

The present structure of the Commission appears to inadequately reflect consumer and payer interests. Moreover, the owners of a listed public company with total income of over $180 million a year would be most unlikely to conclude that a sufficient range of skills to monitor their business could be obtained among three people, however well qualified the appointees may be.

Under the Public Finance Amendment Act 1992, the Commission is required to prepare its annual financial statements as soon as practicable after the end of the financial year. The Commission is included in the fifth and sixth schedules of the Act. Its financial statements are therefore required to be prepared in accordance with generally accepted accounting practices and to include the following:

- a statement of financial position;
- an operating statement reflecting its revenue and expenses;
- a cash flow statement;
- a statement of the financial performance to be achieved during the financial year as established at the start of the year;
- a statement of objectives, specifying the classes of outputs to be produced during the year as established at the beginning of the year;

- a statement of service performance reporting the classes of outputs produced during the year as compared with the classes of outputs established at the start of the year;

- a draft statement of intent relating to the financial year and to each of the following two years. The statement is to be prepared before the start of the financial year. It is required to specify the objectives of the Commission; the nature and scope of activities to be undertaken; the performance targets and other measures by which the performance of the Commission may be judged against its objectives; and, where required by the responsible minister, certain other information. The statement is tabled in Parliament following agreement with the minister.

These requirements are intended to bring Crown entities, particularly those such as the Commission that manage significant Crown operations or assets, under closer scrutiny by the government, parliament and the public. They are not, however, a satisfactory substitute for market disciplines but may be helpful in situations (unlike fire services) where competitive provision of goods and services is infeasible (Schick (1992)).

The provisions of the Public Finance Amendment Act are relatively new and most Crown entities have yet to comply fully with them. The Commission made little progress before its 1993/94 corporate plan in developing performance indicators that would enable an informed external party to judge whether it provided value for money. While considerable progress has been made in its 1993/94 plan, its goals were revised during the year because of the internal review. This approach does not seem to conform with the Act.

In any event, better indicators are required. Many of the Commission's indicators record the number of times a particular activity occurs. There is a risk that such indicators will provide a perverse incentive to increase the number of separate occasions on which the activity occurs with insufficient regard to the benefit that is obtained. It is also difficult to assess the actual performance of the Commission against its intended performance because expected outcomes are not specified for many of the Commission's performance indicators.

The Crown appears to have been presumed to hold the residual ownership interest in the Commission. The Commission was, however, established by the compulsory transfer of the property of former fire boards, Fire Service Commission and territorial authorities (in their capacity as urban fire authorities). The Fire Brigades Act 1906, which provided for the transfer of existing fire brigade assets to fire boards, stated that such assets were to be vested in fire boards in trust for fire prevention purposes.

Leaving aside some doubt about the ownership of the Commission's net assets, the Commission is not required to meet any set financial return target, nor does it appear to be subject to a capital charge, and it is exempt from income tax. These aspects of current arrangements weaken the incentive for the Commission to operate efficiently. They imply that capital has no opportunity cost and could be expected to lead to excessive capital expenditure and assets. They also encourage the Commission to expand its special services (for example water evacuation) which is provided at a subsidised cost to the user, thereby crowding out other providers who may be more efficient.

If the Commission is to continue to provide fire services, its accountability should be improved. The key steps required are to:

- separate regulatory from service delivery functions;

- specify clearly the government's policy on fire and related services; and

- institute a purchase and provider split with the Department of Internal Affairs or the Commission acting as purchaser and the Commission or NZFS fulfilling the provider role.

These steps were recognised by some reports prepared for the 1993/94 internal review and by officials but they have not been implemented apparently because of the Commission's opposition.

6.2 SUMMARY OF FINANCIAL OPERATIONS

The recent financial operations of the Commission are summarised in Table 6.1.

TABLE 6.1
NEW ZEALAND FIRE SERVICE COMMISSION
SUMMARY OF FINANCIAL OPERATIONS

ITEM	1989/90	1990/91[1]	1991/92	1992/93[2]	1993/94
	$M	$M	$M	$M	$M
Personnel and other staff costs	131.1	167.2	134.2	135.0	134.6
Other operating costs	16.5	25.5	21.7	19.8	22.3
Administration costs	4.2	4.6	4.5	5.9	7.7
Net financial charges	8.0	8.6	5.7	4.8	0.4
Total current expenditure	159.8	205.9	166.1	165.5	165.0
Allocations to special funds	6.8	12.1	9.0	8.0	7.3
Loan repayments (net) [3]	1.8	1.7	0.8	2.0	1.3
Capital expenditure [4]	3.8	6.2	6.5	5.5	0.0
Provision for restructuring					30.0
Miscellaneous revenue [5]			(1.8)	(1.4)	(3.6)
Total costs of operations	172.2	225.9	180.6	179.6	200.0
Charged to					
Levy account	155.0	203.3	166.1	165.2	156.4
Crown contribution account	17.2	22.6	14.5	14.4	13.6
Restructuring fund					30.0
Total costs allocated	172.2	225.9	180.6	179.6	200.0
Memorandum items:					
Total capital expenditure	10.0	12.0	13.9	N A	N A
Total assets	217.5	250.3	261.9	289.7	284.8
Capital, reserves and special funds	140.6	162.3	153.2	158.8	157.5
Term liabilities [6]	56.2	59.2	50.2	65.1	72.7

1 Includes 15 months to 30 June 1991.
2 As restated in 1993/94 accounts.
3 Net of sinking fund withdrawal.
4 Includes capital expenditure funded from current revenue only. Total capital expenditure is shown as a memorandum item.
5 Miscellaneous revenue offset the Crown's contribution before 1991/92.
6 Excludes the current portion of term liabilities.

The table reflects the basis on which the total costs of the Commission are assessed and charged to the levy and Crown contribution accounts rather than its net expenditure. The following points arise from an analysis of the Commission's accounts:

- leaving aside the costs of restructuring, the total costs of the Commission increased from $172 million in 1989/90 to $181 million in 1991/92 before declining to $170 million in 1993/94. The decline in total costs over the past two years has arisen from a reduction in capital expenditure funded from revenue and lower allocations to special funds. Total current expenditure has remained relatively stable since 1989/90;

- personnel costs are the most significant item of current expenditure. They account for almost 80 percent of the Commission's total costs of operation (excluding the costs of restructuring). It follows that any moves to improve the efficiency of the present operations need to focus on personnel costs;

- the present basis of calculating the chargeable costs of the Commission's operations confuses revenue and capital items. The following points illustrate this concern:

  - there is no provision for depreciation and thus operating costs are understated. A separate statement of income and expenditure which was introduced in 1991/92 takes depreciation into account but the Commission states that depreciation is omitted from its chargeable costs because depreciation is not a class of expenditure which is funded by either the levy or the Crown contribution. Assets are stated net of accumulated depreciation;

  - allocations to special funds appear to reflect discretionary appropriations to reserves rather than a cost of operations. Special funds are disclosed in the balance sheet as if they were part of the Crown's equity in the Commission. The equivalent treatment under the Companies Act generally requires a clear distinction between reserves, which are an appropriation of profits, and provisions which are set aside to meet expenditure which properly relates to the year in question but where the amount involved is uncertain. Reserves seem to be used to smooth reported costs of operations; and

  - some loan repayments and capital expenditure are treated as operating costs. While this treatment may partly compensate for the omission of depreciation, it seems to be inferior to a proper separation of current and capital items.

  There is a case for updating the relevant financial provisions of the Act, should the Commission continue to supply fire services on the present basis;

- the Commission's overall borrowing does not seem to be excessive in relation to its assets. The wide scope to borrow under the present Act should, however, be reviewed;

- the Commission's balance sheet footings have expanded from $217 million in March 1990 to $285 million in June 1994, an increase of 31 percent. This growth is excessive. It reflects a build up in liquidity caused by an excessive levy. Liquidity should be reduced by reducing the rate of levy; and

- the costs of restructuring have been charged to the levy account and not allocated between the levy and Crown contribution accounts. The reason for this treatment is unknown.

6.3 OPPORTUNITIES FOR IMPROVING EFFICIENCY

There is a continual need to examine public sector activities to ensure that the resources committed to them are used to best effect. If public sector producers use resources inefficiently, national output and incomes will be lower than otherwise. Public sector activity may replace private sector activity when the latter yields a better return to the community. Excessive costs imposed on firms reduce the international competitiveness of domestic producers of tradeable goods and services, thereby lowering output and incomes. In addition, public sector producers may artificially bid up the cost of inputs, for example for particular classes of labour, thereby indirectly reducing the competitiveness of firms. Conversely, if inadequate resources are devoted to public sector activities, community welfare will be impaired.

There is little evidence that productivity improvements in the fire service over recent years have matched those of most private sector (including privatised public sector) producers and of corporatised public enterprises. Employment and related policies of the Commission, which are critical to its cost structure, are excessively generous and would be unsustainable in a competitive environment. The main aspects of the Commission that should be reviewed with the objective of improving its efficiency, within existing institutional arrangements, are discussed below.

Standards of Fire Cover

The New Zealand Fire Service Commission published the present standards of fire cover for urban fire districts in the *New Zealand Gazette* on 5 May 1988. This followed a review by the Fire Service Commission of the resources that it considered necessary to fulfil its statutory obligations (Strategos (1989)). The revised standards relate to the maximum response time (the time between the receipt of an alarm by the NZFS and the arrival of a fire appliance at the fire), the number of appliances to be sent initially to each fire call, the number of supporting appliances to be available and crew sizes. The standards of fire cover have never been formally approved by the government, despite their importance to the efficiency of fire services and related activities.

Response times specified in the standards of cover are summarised in Table 6.2. They are based on the classification of fire risks within each fire district into one of the following three categories:

- class one (high risk):
  - buildings or groups of buildings located in urban areas, principally within the largest cities which, because of their size, construction, contents or processes, present a serious risk from fire, such as:
    (1) high rise buildings or large complexes;
    (2) concentrated commercial, business and industrial areas, or densely grouped buildings where there is a likelihood of a serious spread of fire;
    (3) large petrochemical processing plants and other hazardous industries, together with associated storage; and

(4) wharf areas and associated shipping, warehousing and storage;

- class two (normal risk):

  - the risks normally associated with the urban areas of most towns and cities such as:

    (1) normal commercial, business and industrial areas which do not constitute a serious risk from fire; and

    (2) detached and semi-detached residential property; and

- class three (low risk):

  - the risk normally associated with small towns and communities with a population of less than 1,500 including immediately adjoining rural areas, or sparsely populated urban areas on the fringes of large towns and cities with an average density of population of no more than 2.5 persons to the hectare.[48]

Pumping appliances are to have a capacity of at least 30 litres per second and a crew of four.

TABLE 6.2
RESPONSE TIMES FOR URBAN FIRE DISTRICTS

RISK CLASS & RESPONSE	APPLIANCES	MAXIMUM TIME
	Number	Minutes
One (high)		
Initial	3	6, 8, 10 respectively
Support	6	20 of being called
Two (normal)		
Initial	2	8, 10 respectively
Support	2	20 of being called
Three (low)		
Initial	1	10
Support	2	30 of being called

Source: Derived from New Zealand Gazette of 5 May 1988.

48 The risk categories are understood to have been a simplification of the 5 categories applicable in the United Kingdom. See Simmonds (1989) for a summary of the United Kingdom's risk categories.

The standards recognised that the NZFS would not always be able to meet the minimum standard of attendance. For this reason, the standards stated:

> Where, because of the location of existing stations or other limitations, it is not possible for fire appliances to arrive within the prescribed times, consideration should be given to increasing the number of appliances in the initial response to make up for the late arrival time.

In addition, the Commission's performance measure specified in its 1993/94 corporate plan states that 85 percent of responses within urban fire districts are to meet the standards of fire cover. The NZFS actual performance in 1993/94 fell slightly short of this target as 84 percent of incidents were attended within the required time.

The standards stated that operational planning should take into account the possibility of two calls being received at the same time, or of a second call being received while appliances are already at an incident. It was acknowledged that in such circumstances the initial and support response times to calls may need to be increased. Area commanders were required to arrange for mobilisation of additional resources from within or beyond their areas to assist at serious fires.

Because of the rapid speed at which fires spread and toxicity builds up, a quick response is necessary if the risk of loss of life, injury and property damage is to be reduced significantly (Strategos (1989)). A rapid response time involves increased capital and operating costs arising from more stations, appliances and firefighters. Thus a trade-off between the costs of fire services and their benefits is required.

Strategos (1989) reported that most North American fire departments visited had shorter response times than New Zealand but concluded that it was "uncertain whether shortening response times could impact radically on the protection of life and property despite firefighters' best efforts." Strategos suggested that road congestion and the existing location of stations may have influenced the response times set and may affect their achievement, particularly in the main centres. The implication of Strategos's comments is that a better distribution of fire stations could improve response times. The location of fire stations was not examined in the 1993/94 internal review.

Aside from the general issue of response times, informed commentators have suggested to the NZBR that the number of appliances dispatched in response to an alarm could be reduced in the following (and comparable) circumstances:

- incidents generated by automatic alarms in large office buildings in the main cities. Most calls are false alarms which can be dealt with by a single appliance. In addition, where there is an actual fire, there would normally be multiple follow-up emergency calls by telephone. This may not happen outside of normal office hours when the risk to life is limited. It may be possible to modify the present standards to reflect the actual risk of an emergency in determining the initial response to an alarm. There is recognition in the existing standards that additional appliances, such as special appliances, may be dispatched based on the precise nature of the call. The suggestion is that a similar modification could lead to the dispatching of fewer appliances; and

- incidents in respect of properties that have a high degree of fire protection. A fire in structures with sprinklers, for example, would not justify the dispatch of the same number of appliances as a similar fire in other structures. The risk of sprinkler failure is small, if not negligible. There are almost 5,000 buildings with sprinkler systems installed. The possibility that a call to such buildings may be caused by an explosion and that people may be trapped has been suggested as a reason for continuing the present practice of not dispatching fewer appliances in

response to such alarms. The likelihood of such an occurrence in an office building is small.[49] The level of fire protection at the site of the incident is not adequately reflected in the existing fire cover standards; and

- where the initial response exceeds the standards. It appears that the initial response is sometimes more than the required initial response in circumstances where there are no strong grounds for suspecting that there is an actual fire.[50]

The dispatch of an excessive number of appliances relative to the actual risk involved is not costless. The following costs are involved:

- fire protection for other areas is reduced;
- avoidable direct costs are incurred (for example higher operating costs and more appliances and career firefighters than otherwise would be required); and
- the public incur unnecessary costs, arising from delays caused by giving way to fire appliances, risks of accidents involving fire appliances and additional noise.

On the other hand, if insufficient resources are dispatched, fire losses will be larger than otherwise. As is the present practice, additional appliances should be dispatched if required. The question that needs to be addressed is the balance that is to be struck between the risk of an excessive and an inadequate initial response.

In the NZBR's opinion, the issue of response times, including the number of appliances to be dispatched, should be reviewed by the government with the objective of establishing an optimal trade-off between the costs of fire services, fire losses and the risk of loss of life and injury. The review should give close attention to the actual risks involved in particular areas and the extent to which fire losses can be reduced by fire services.

- *Crew Size*

Crew size is related to the number of appliances dispatched in response to an incident as it affects the number of firefighters available at the scene. From an economic perspective, crew size is important in relation to career firefighters as personnel costs are the largest component of the Commission's expenditure. Furthermore, the provision of one firefighter for 24 hour 7 days a week coverage under current shift arrangements requires the employment of 4.6 firefighters. The personnel cost of providing a pump appliance crewed by 4 career firefighters for 24 hour coverage 7 days a week is understood to be around $1 million a year. Crewing levels have been a contentious industrial relations issue.

Before the formation of the NZFS, crew sizes for pump appliances ranged from one to six. The Audit Office reported that soon after the formation of the Fire Service Commission, the Commission sought to rationalise crewing levels. Although studies were undertaken in 1978 and 1984 and some changes were implemented, the Fire Service Commission did not release an official statement of its policy until October

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49 It is perhaps of some significance that the government has been approached by a firm that was interested in providing an alternative fire service in respect of central city buildings that have a high degree of in-built fire protection.

50 There have been reports in the press that the risk associated with central city buildings in Christchurch has been reassessed resulting in the despatch of fewer appliances in some cases. The initial response is understood to have been reduced but still meets the standard. Firefighters have criticised this development and were reported to be taking additional appliances to the incident.

1987, eleven years after it became responsible for the provision of fire services (Audit Office (1988)).

The standards which apply at present are summarised below:

- pump appliances, including those which have a rescue or hydraulic elevating platform capability, are to be crewed by an officer and three firefighters;
- special heavy rescue tenders are to be crewed by an officer and three firefighters;
- special appliances such as command units, breathing apparatus tenders, turntable ladders, hazmat units and light rescue tenders are to be crewed by an officer and one firefighter; and
- special appliances such as hose layers, foam salvage and water tenders are to be crewed by two firefighters.

Strategos (1989) noted that overseas experience suggests that crew sizes for a standard pump appliance range from two to five. Most chief officers consulted by Strategos were reported to be uncomfortable with crew sizes of less than four. Strategos suggested that if sprinklers were installed in all structures, the size of crew for a pump appliance could be reduced by one firefighter, except perhaps in central city or heavy industrial areas. More recently, some observers suggested to the NZBR that the crew required for pumps and specialist appliances could be reduced, at least in some circumstances. The 1993 ministerial review of fire services accepted that crew size should be re-examined despite a 1992 internal review which essentially concluded that existing arrangements and standardisation should be continued (Lee (1993)).

The standardisation of fire crews and appliance responses have contributed to higher and possibly more uniform standards of service in urban fire districts. The question of whether the benefits of such standardisation outweigh the costs involved is, however, unresolved. The loss from fire and the frequency of fires can be expected to vary from one area to another and from one period of the day to another, reflecting factors such as the value of property, the number of people at risk and the activity being undertaken. The provision of a uniform level of service, including crew sizes, in circumstances where the expected loss differs implies a variable cost per dollar of expected loss. At the margin, resources could be reallocated to obtain a higher expected benefit for the same cost. This conclusion is unaffected by the risk category.[51] The experience of some other countries and New Zealand's previous experience suggest that greater variability in resources despatched to respond to emergencies - to reflect better the risk entailed - should be possible from an operational perspective.

The foregoing argument suggests that uniform service, such as standard crewing size and response times, is unlikely to be optimal. The question that needs to be re-examined is whether present crewing standards for pumps and specialist appliances that are crewed by career firefighters are justified in all circumstances having regard to the costs and benefits involved. This matter should be subject to a detailed review involving experts who are independent of the Commission, the NZFS and the union.

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51 Consider two time periods (A and B). Assume that the expected fire loss during period A is 20 percent higher than in period B solely because the expected number of fires is higher. Assume that expected losses in period A just justify one appliance crewed by employed firefighters. In these circumstances, the maintenance of the same number of career firefighters during period B is uneconomic. A smaller career crew in period B may, however, be justified.

Key Personnel Issues

Excessive restrictions apply to the work that firefighters undertake during weekends and nights. Maintenance work during weekends is restricted to Saturday mornings and an hour or two on Sundays. Because of these arrangements, career firefighters who work during weekends and nights are effectively paid on a full-time basis when they are in effect on stand-by at the station for much of the time. Staff are paid for a 42 hour week but on average only 17.25 hours are worked. The independent review team commented that the present shift arrangements were "exceptionally unproductive" McCaw *et al.* (1993).

When overtime is taken into account, pay and conditions for career firefighters are superior to those of similar state servants, such as police, prison and ambulance officers, and nurses. The fire service has retained payment at time and a half and double time for overtime, whereas most private sector employees, together with police and nurses, have abandoned such arrangements. The remuneration terms for prison officers have also moved substantially in this direction. The overall generosity of pay and conditions for career firefighters relative to present labour market conditions is demonstrated by the absence of any significant recruitment or retention difficulties within the fire service. (When did the NZFS last need to mount a significant campaign to recruit career firefighters?) This helps to explain recent concerns that the average age of firefighters is too high.

Restrictive work practices and high wage costs would be expected in a highly protected, goverment-controlled industry as employees capture rents generated in the absence of competition. The NZFS conforms to this pattern. The preferred solution is to introduce competition in the supply of fire services as excessive remuneration and restrictive work practices would not endure in such an environment. If that approach is not adopted, the government should insist on the Commission reducing personnel costs by lowering pay rates, especially for overtime, modifying shift arrangements to better utilise career firefighters and introducing lower rates of pay for personnel who are on standby only. Recruitment and retention of personnel in each locality should govern the level of remuneration. The government has moved to reduce personnel costs but it needs to move further to apply this principle.

- *Balance Between Volunteers and Career Firefighters*

A key factor that affects the costs of fire services is the relative reliance on career firefighters and volunteers. Most personnel costs arise from the employment of career firefighters. Standards of fire cover, the number of incidents attended and changing work patterns are relevant factors because they may make it infeasible to rely on volunteers in some circumstances.

In March 1975, the permanent strength of the fire services was 1,879 personnel. This appears to have grown to 2,522 (uniform and non-uniform) by March 1993, an average increase of around 1.6 percent a year. This growth seems to reflect a large increase in non-operational personnel, for example 109 personnel are employed in the national headquarters. This issue is now being addressed. In comparison, volunteer firefighters appear to have grown from 6,434 to 6,955 over the same period, an increase of less than 0.5 percent a year. The total number of incidents recorded between 1974 and 1992/93 appears to have grown at a rate comparable to the rate of growth in volunteers.[52]

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52 The annual average number of fires reported over seven years to 1992 totalled 21,606 and appears to be relatively stable.

There appears to have been a tendency for career firefighters to replace volunteer firefighters. There have also been tensions between these classes of firefighters, with career firefighters reported to be reluctant to work with volunteers. This has reduced the scope for appliances to be crewed by volunteers and career firefighters, depending on the shift and risks involved. From a cost point of view, reliance should be placed on volunteer firefighters whenever this is feasible from an operational perspective. The balance between career and volunteer firefighters should be reviewed with the aim of achieving this objective.

- *Paid Part-Time Firefighters*

While deployment of volunteer firefighters in urban and rural areas should be encouraged where feasible and while the levels of incidents and risk justify career firefighters in certain circumstances, there may be scope to introduce personnel arrangements that lie between these polar cases. Some firefighters could, for instance, be retained on a fee for service basis while engaging in other employment. They could be paid for undertaking training, for attending incidents and for generally making their services available under agreed conditions (for example within certain times on particular days or at particular times, if called). Paid part-time firefighters could extend the range of people available to the NZFS while avoiding the high cost of career firefighters. Such an arrangement may be suitable for crewing appliances that are dispatched in response to second and subsequent alarms where the standard response time is longer (see Table 6.2 above).

Part-time firefighting might be attractive to people such as self-employed people who could not afford to be volunteers and to some former career firefighters. An arrangement along these lines could provide a less costly means of managing peak firefighting requirements in the main centres than reliance on career firefighters. As with other employment, terms and conditions of part-time firefighters should be set and subsequently maintained at levels that just enable the required number of firefighters with appropriate skills to be recruited and retained for the relevant brigade. Part-time firefighters are employed in some overseas fire services e.g. in the United Kingdom.

User Charges

The Commission is permitted to charge for attendance at hazardous substance emergencies including those involving fire, for fire safety and for fighting fires relating to commercial forestry. The Commission may also charge in the case of false alarms. The latter charge was introduced because poorly maintained equipment was a cause of false alarms. They accounted for 61 percent of all false alarms in 1993/94.

As expected, false alarms arising from equipment failure have fallen since the policy was introduced in the Fire Service Amendment Act 1990. In the 15 months to June 1990, there was an average of 886 such false alarms each month compared with 733 in the year to June 1992, a decline of 21 percent. All false alarms fell during the same period by just 5 percent. While other factors may have influenced these results, there can be little doubt that the charging policy has had a marked effect.

The Commission is budgeting for miscellaneous revenue of about $2 million a year through to 1995/96. This represents 1 percent of its total costs and 6 percent of its estimated costs of non-fire emergencies (special services). Much wider application of user charges to encourage the avoidance of fire and the minimisation of fire losses, and to help ration demand for fire services, should be adopted. User charges should apply to all aspects of the Commission's activities. This would require legislative changes.

Other Efficiency Proposals

The scope for efficiency improvements in the following areas should be examined:

- fire safety. The prevention of fires is often the most desirable option although it would not be economic or realistic to expect all fires to be prevented. The Commission made much of its decision to increase expenditure allocated to fire safety from $6 million in 1991/92 to $10 million in its 1992/93 and 1993/94 corporate plans. This followed criticism that fire safety was being given inadequate priority. The additional allocation, however, largely reflected a re-classification of spending from urban fire protection rather than a change in the priorities of the Commission. Moreover, actual expenditure in 1993/94 was $6.9 million, just 67 percent of the budgeted amount.

  The efficacy of the Commission's fire safety activities and the relative priority of fire safety should be reviewed in the light of the statutory direction that fire safety is to be a matter of prime importance. The review should also address unjustified impediments to the career prospects of firefighters who are employed in fire safety activities compared to those engaged in other activities. These matters and the view that fire safety is not given sufficient priority were noted in the 1993/94 internal review;

- organisation and management. The structure of the NZFS is little changed from that put in place in the mid-1970s. The number of administrative staff at regional and national levels has grown excessively since the nationalisation of the fire service. Even with the reductions that are to be implemented in 1994/95 there will be a substantial administrative structure. Total personnel employed in the management structure should be reduced by instituting a zero based budget for administration;

- appointments and promotion. To improve performance all positions should be advertised and promotions should be based on assessed ability to perform at the level required. Poorly performing uniformed and other staff should be replaced;

- capital expenditure. The Commission spent $14 million on capital items in 1991/92 but appears to have cut back its capital expenditure since then. The cost of new appliances is one of the largest items of capital expenditure. The justification for new appliances and the retention of existing appliances should be subject to greater scrutiny. There has been a large expansion in appliances. On the nationalisation of the fire service there were 470 self-propelled pump appliances. By March 1993 there were some 705 pump appliances and 103 special appliances. This growth is well in excess of the growth in incidents. The NZFS investment in appliances was not subject to close scrutiny in the recent review.

  The building programme provides for 9.5 station buildings to be built each year. The decision to build a new fire station in Thorndon, Wellington, has been criticised by insurance industry participants on the grounds that the risk in the area does not justify the expenditure involved. This argument reflects the view that the present fire service standards do not take sufficient account of the level of fire protection contained in many modern buildings. The cost of Nelson's new station was also criticised as being excessive (Lee (1993)).

  Building requirements should be reviewed to reflect a realistic assessment of future requirements, opportunities for better use of existing stations, the use of buildings other than purpose built ones and the costs of fire services. The possibility of closing existing stations to relocate resources to reflect changes in

the distribution of risks should also be examined more closely than appears to have been the case over recent years. The 1993/94 internal review did not examine these matters; and

- housing and motor vehicles. The NZBR is sceptical that a strong case can be made for the provision of houses (88) and motor vehicles (100) for employees. Lee (1993) did not accept the conclusion of a recent internal review of NZFS housing policy which was that current policy be broadly retained.

Conclusion

The above analysis shows that there is substantial scope for reducing the cost of the Commission without lowering the effective level of fire protection. The chief executive's report proposed worthwhile savings, most of which are still to be realised, but more needs to be done to correct a decade of excessive spending and inadequate monitoring. Total actual expenditure should be reduced progressively in real terms by between 30 and 40 percent over the five years to 1998/99 from the 1993/94 budget of $170.5 million. This would result in cost savings of between $50 and $70 million and is similar to the savings obtained from the commercialisation of other public sector activities. This implies a level of savings which is about double that proposed by the chief executive. The Commission should be charged with the task of developing and implementing proposals to achieve such savings.

The Commission, the NZFS and firefighters may defend present arrangements.[53] Arguments from these quarters suggesting that New Zealand's fire services are as economically efficient as possible, that only minor savings are possible without jeopardising lives and property, or that the chief executive's proposals are the best that can be hoped for over the next few years should be put to the impartial test of the market. This could be achieved by introducing greater competition for the supply of fire services as proposed in section 4.

6.4 SHOULD THE FIRE SERVICE ABSORB OTHER EMERGENCY SERVICES?

The idea of merging fire and ambulance responsibilities has been raised in public debate on fire services. After raising this possibility, the NZFS began to refer to the possibility of a strategic alliance rather than a merger with ambulance services. In some countries, these emergency responsibilities are undertaken by a single organisation. The question of whether the NZFS should absorb civil defence has also been raised.

Ambulance services constitute part of the health system. Before recent health reforms, a mix of arrangements applied. Private not-for-profit entities, such as the Order of St John and the Wellington Free Ambulance, provided ambulance services for the larger Area Hospital Boards (AHBs). In addition, some AHBs (for example Southland) provided their own ambulance service. In other cases, ambulance services were provided by agreement with a hospital rather than an AHB. On occasions, ambulance officers were provided with equipment made available by an AHB or a hospital.

The Order of St John is the largest provider of ambulance services, supplying around 75 percent of the market. The second largest provider is the Wellington Free

53 Cabinet papers show that the Commission tried to gain government approval to treat most of the productivity savings required in 1993/94 as a one off reduction rather than as a permanent reduction in its base allocation for subsequent years.

Ambulance which is operated by a charitable society. Although private ambulance services were paid by AHBs for their services, the costs of the services exceeded public funding. The Order of St John requests a donation or a fee from patients and, in the case of accidents, charges the ARCIC. Bad debts are understood to be large. A subscription service providing insurance against emergency ambulance charges is also available. In addition, community fund raising supports ambulance services.

Under the new health arrangements, ambulance services are recognised as a core health service. In the interim, existing arrangements have been extended. It is understood that ambulance services are likely to be provided under contract to Regional Health Authorities (health purchasers and funders) rather than Crown Health Enterprises (health providers). In effect, suppliers of ambulance services would be treated as separate health providers similar to general medical practitioners rather than as a component of another provider such as a hospital. One reason for this approach is that Regional Health Authorities may not wish Crown Health Enterprises to influence the allocation of health services among competing providers by controlling ambulance services.

A preliminary examination of whether the NZFS and ambulance services should be merged has been undertaken as part of this study. There would be some advantages in a unified emergency service. Overseas experience suggests that efficiencies may arise from the joint production of fire and ambulance services, with savings in personnel and capital costs. However, *under present institutional arrangements for the provision of fire services*, a merger of emergency services is undesirable for the following reasons:

- the priority in respect of the Commission should be to improve the productivity of existing activities rather than to divert attention to the absorption of new functions;

- the Commission would be the dominant party in any merger. Thus the inadequate accountability structure that applies to the Commission would be extended to ambulance services with a detrimental effect on its efficiency in the longer term.

- there is competition in the provision of ambulance services and this is likely to intensify. Regional Health Authorities are permitted to contract on a competitive basis for health services. There is no competitive provision of fire services. If ambulance services were supplied by the NZFS, with no requirement on the NZFS to use capital efficiently, private sector supply of ambulance services would be driven out of the market. This would lead to inefficiencies;

- there would be pressure to extend the excessive employment conditions, including restrictive work practices, which apply to firefighters to ambulance services that operate satisfactorily with less generous employment arrangements. There would also be increased risk of industrial action affecting ambulance services;

- the community voluntarily supports ambulance services. Their absorption by the Commission would result in the full costs of the service falling on the taxpayer. An element of private charity reduces the adverse impact on output and incomes of taxation, and encourages individuals and firms to reveal their preferences;

- the management approaches of the two services are different. The NZFS is organised on a command basis, although this is changing, whereas ambulance services are generally organised along business lines. The NZFS is a national operation whereas ambulance services are organised on a regional or local basis.

The NZBR is unaware of a compelling case for the provision of ambulance services on a national basis;

- the assets of the NZFS are vested in the Commission. On the other hand, the assets of the Order of St John, the principal ambulance operator, are not in public hands and title to them is complicated by the fact that St John in New Zealand is a branch of an international Order, created by Royal Statute and based in the United Kingdom. It would be undesirable for the government to nationalise such assets. While an agreement with the Order of St John to use existing assets might be possible, additional costs would fall on the taxpayer; and

- most of the activities of the NZFS and the ambulance service are undertaken separately. The training requirements of each service are largely dissimilar. Both services, however, attend some incidents, share some facilities, draw on some common personnel (some volunteer ambulance officers are also volunteer firefighters) and ambulance services are occasionally operated by volunteer firefighters (for example Kawerau during the day).

The issues that need to be examined in respect of ambulance and fire services, if present institutional arrangements for fire services continue, are as follows:

- the scope for closer cooperation in controlling the dispatch of fire appliances and ambulances to emergencies, in communications systems and in the rationalisation of stations. These matters are currently under investigation. As noted above, the benefits of reducing the apparent duplication of equipment and functions need to be weighed against related costs; and

- more importantly, whether an extra dollar of expenditure on fire or ambulance services is likely to provide a higher return to the community from reduced loss of life, injuries and fire losses, and less severe illnesses. The NZBR understands that no such study has been undertaken recently, if at all.

  Largely at the request of the ambulance services, the NZFS is responding to an increasing number of emergency medical calls that arise when fire services are likely to be able to reach a patient sooner than an ambulance, for example in the case of a heart attack. This suggests that the balance of resources allocated between ambulance and fire services may be inappropriate. There is the possibility that the tied funding of fire services has resulted in resources being committed to fire services that would provide a higher return to the community if they were reallocated to ambulance services.

While the NZBR has not examined the merits of merging the NZFS and civil defence activities, it believes that priority should be given to improving the efficiency of the Commission as noted above. A change in its functions should not be allowed to divert attention from the need to address the productivity of the NZFS. For this reason, the NZFS should not be permitted to bid for the supply of ambulance services.

7 CONCLUSIONS

The key conclusions arising from the analysis presented in this report are as follows:

- the provision and funding of fire services should be viewed in a broad context. The aim of policy should be to achieve optimal investment in fire prevention, loss minimisation, insurance and fire services;

- incentives for optimal investment in the prevention of fires and the minimisation of deaths and injuries from fires are impaired by the Accident Rehabilitation and Compensation Insurance Corporation scheme and the high levels of subsidisation of most health care;

- beyond the establishment of a minimum code aimed at promoting the safety of the public, economic grounds for government action affecting the prevention of fire, fire losses, fire insurance and fire services are not compelling;

- there is no compelling case for the public provision or funding of fire services;

- the critical feature of fire services, which may justify government action, is the perceived free-rider problem. This problem arises where the community is not prepared to withhold fire services from people who refuse to pay. Government action to enable providers of fire services to receive payment for their services may be required;

- as a corollary to such action, the government may need to regulate the minimum quality of services to be provided;

- fire services are essentially of a local rather than a national nature;

- competition in the provision of fire services, especially for services provided by career firefighters, is vital for the promotion of economically efficient fire services;

- the present levy scheme is a relatively inefficient method of financing fire services because the costs imposed on individuals and firms do not reflect:

  - the quality of service available to each property owner;

  - fire risks pertaining to the particular property; and

  - the extent to which fire services are used by the property owner.

  Prices charged for fire services should reflect these factors.

If the perceived free-rider problem prevents the provision and funding of fire services through a competitive market on a similar basis to most other goods and services, the government should put in place arrangements that facilitate payment for fire services and promote, as far as is possible, economically efficient fire services. This requires the introduction of competition for the supply of fire services and more efficient pricing mechanisms than the present levy system.

The proposals set out below are designed to achieve these objectives:

- the role of the government should include the following:
  - fire safety regulation including provision for the optimal enforcement of regulations. The government should provide minimum standards aimed at preserving life, the avoidance of personal injuries and the minimisation of fire losses by neighbouring property owners, having regard to the costs and benefits involved;
  - national fire safety programmes. To the extent that such programmes are a valid function of central government, they should be organised as part of the government's public health and accident prevention programmes and should generally be funded accordingly;
  - fire service standards. The government should prescribe minimum standards for fire services. The classes of services to be provided should be restricted and would not include special services for which a perceived free-rider problem does not arise (for example spills of hazardous materials and water evacuation);
  - regulating funding to facilitate the supply of fire services; and
  - arranging fire protection for government-owned property. The government should generally take steps to protect its property on a similar basis to prudent private sector property owners.
- fire services should usually be provided on a competitive basis with providers having the right to enter the market provided that minimum standards are met;
- existing fire services should be reorganised, as far as possible, on a competitively neutral basis;
- firms should be permitted to provide their own fire services, provided that they met minimum standards set by the government. This would facilitate competition and promote efficiency. Volunteer services are likely to be competitive suppliers in many towns and rural areas;
- in rural areas, where fire services are modest and are provided by volunteers, territorial authorities should continue to be permitted to arrange the provision of fire services;
- as a normal rule property owners should be obliged to subscribe for the fire service of their choice. The government should assist by providing mechanisms to enable fire services to collect subscriptions and user fees; and
- if competitive fire services are not permitted, the supply of fire services should be organised by territorial local authorities with the right to supply such services put out for tender on a regular basis.

If the above proposals are not accepted by the government, steps should be taken to reduce the costs of fire services, as suggested in section 6. Cost reductions should focus on services provided by career firefighters which account for most of the fire service expenditure. The government should aim to reduce the real cost of fire services over the five years to 1999/2000 by between 30 and 40 percent of the Commission's 1993/94 budget. This would provide a real cost saving to the community of between $50 and $70 million, approximately double that proposed by the chief executive of the NZFS.

These proposals would advance efficiency by promoting better allocation of resources among fire prevention, loss minimisation, insurance and fire services. They would improve the equity of present arrangements by replacing the existing levy scheme with a market-based pricing system. Prices could be expected to reflect the quality of services available to each property owner, the fire risks involved, and the use that is made of fire services to a far greater extent than at present.

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