



Metropolitan transportation planning in the 1990s: comparisons and contrasts in New Zealand, Chile and California

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Abstract

This article reviews major events and trends in metropolitan transportation planning and policy during the 1990s in three divergent Pacific rim jurisdictions: New Zealand, Chile, and California. Major metropolitan areas in each country have seen rising motorization, increasing congestion, and privatization of transportation services. Devolution of transportation planning responsibility has occurred; to a lesser degree, funding responsibility has been devolved from central to regional/local government. New Zealand pushed privatization harder in the 1990s than either Chile or California. While no dominant model of transportation planning has emerged, metropolitan-level planning has become more prominent and autonomous in each country studied. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

Cross-national comparisons of metropolitan governance, planning and policy are timely. The 1980s and 1990s witnessed a revitalization of regional economics and planning, and some analysts (e.g. Borja and Castells, 1996; Pierce, 1993), see a rise in the importance, relevance and power of the metropolitan region at the expense of the nation-state.

That the metropolitan region (defined here as a commuting zone spanning multiple local jurisdictions) is the logical scale of urban transportation planning and related activity systems is almost an axiom in transportation studies. Research by Newman and Kenworthy throughout the decade of the 1990s bolstered the importance of the metropolitan region as a unit of analysis in comparative studies of transportation policies and their energy and environmental consequences (Newman et al., 1998). Even the most vehement critics of Newman and Kenworthy's policy prescriptions have essentially endorsed metropolitan areas as important units of analysis for transportation policy.

Yet despite the notable and welcome exception of Cervero's recent *The Transit Metropolis: A Global Inquiry* (1998), cross-national comparisons of regional (metropolitan-scale) transportation planning *practices* remain rare.

Certainly, the historic insularity provided by the nation-state and gulfs of language and culture make such comparative analysis difficult, but the effort is worth making, as common challenges increase. Such challenges, faced by most of the world's great metropolitan areas include:

- Rapidly rising automobile ownership and use;
- Central government fiscal retrenchment; and
- Globalization of basic economic activity.

To address this research gap, this article compares and contrasts recent experiences with regional transportation planning in New Zealand, the Republic of Chile and the State of California. The California case is used to a limited extent as an exemplar for all of the USA. We are two California-based transportation researchers, fortunate enough to have had substantial experience with transportation planning in the two other Pacific Rim countries. Our aim is to outline the evolution of metropolitan-scale transportation planning in each country during the 1990s, draw some conclusions about similarities and differences in these experiences, and derive some lessons for transportation planners. We also hope to encourage similar studies of regional transportation planning in other national settings.

While our choice of jurisdictions is somewhat opportunistic, there are intriguing commonalities: All three began the decade of the 1990s with major restructuring of the legal and political framework for urban and metropolitan

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transportation planning. In each case this restructuring sought two somewhat contradictory sets of goals:

- To rationalize and improve the efficiency of metropolitan transportation as an engine for economic growth; including substantial moves towards privatization of transportation services; and
- To systematically mitigate transportation-related externalities and formally recognize environmental and fiscal limits to the expansion of transportation infrastructure.

For each country, relevant historical circumstances and the legislative and political framework of transportation planning are outlined. Key provisions of the new legislation and planning mandates for regional and metropolitan transportation planning are detailed.

Major case studies and examples are drawn from the Auckland and Wellington regions of New Zealand, the Santiago region in Chile and the San Francisco Bay Area and other regions in California. The major data for this study are regional transportation planning documents, specifically:

- Regional Policy Statements and Regional Land Transport Strategies for Auckland and Wellington;
- The 1994 Santiago Regulatory Plan; and
- Current Congestion Management Programs and other regional and subregional planning documents for several California counties, including San Francisco and Los Angeles.

Typical and innovative regional transportation plans were reviewed and examined, focusing on plan documents and processes that link long-range planning and project implementation issues (including financial issues). Plan analysis was supplemented by participatory observation and by interviews with regional transportation planners, allowing deeper insight into how new laws and policies have been interpreted and implemented by regional agencies in each country.

2. New Zealand

With 3.7 million citizens on islands totaling approximately 270,000 square km (km²), It is noteworthy for its relative isolation: the nearest major landmass, Australia, is 2000 km distant. The challenge of reaching overseas markets has shaped much of the country's modern history. Despite a rural heritage and the continued economic importance of agriculture and natural resources the population is 85% urban.

Over 30% of New Zealanders reside in greater Auckland, the largest metropolitan center. Collectively, the three major centers of Auckland, Wellington, and Christchurch account for one-half of the country's population. The Wellington

and Christchurch metropolitan regions each have populations of just over 400,000.

New Zealand has 92,000 km of public roads (40 persons per km, comparable to the US). The New Zealand highway system consists entirely of two-lane roads outside major cities. Significant motorways exist only in Auckland and Wellington.

From 1972 to 1991, New Zealand's motor vehicle fleet increased by 24% more than population; the number of vehicles per capita remained constant from 1991 to 1996. In 1996, New Zealanders owned 1.7 million cars and 2.5 million motor vehicles of all types; in the Auckland region, there were 560,000 cars and 652,000 total vehicles. With 0.55 vehicles per capita nationwide and 0.61 per capita in the Auckland region, vehicle ownership is comparable to Canada (0.60) and not far behind the US (0.75). (Auckland Regional Council Land Transport Committee, 1998; New Zealand House of Representatives, 1998, p. 50).

The annual number of vehicle trips per household (2140) is higher than in the US (1700) but average vehicle kilometers traveled (vkt) per household (17,100) is well below the US figure of 24,300 vkt (Statistics New Zealand, 1995, pp. 176–178; US DoT, 1994 pp. 9–10). New Zealand's smaller metropolitan areas, slightly larger average household and a somewhat higher proportion of single-family detached dwellings compared with the US helps explain the former difference. The lack of extensive freeways, relatively higher fuel prices and correlated tendencies for less dispersed land use are proximate causes of the latter difference.

2.1. Evolution of transport policy in New Zealand

From the late 19th century through the 1970s, New Zealand's central government played a key and generally growing role in the management of the export-driven economy. Central government bureaucracies came to own and operate the rail and air transportation systems as well as state highways and many over-the-road common carriers. Local boards controlled ports, but central government closely regulated maritime operations.

In 1984, New Zealand began a period of radical restructuring. With respect to transportation, the central government moved from ownership/control, arbitration and prescription, to light-handed regulation. In 1991, the central government announced it would manage transportation: *strategically* (not operationally), *minimally* (with as few administrative units as possible); *cost effectively*; *accountably*; and *multi-modally*. If government intervention was deemed to be warranted, beneficiaries should bear the cost of intervention whenever practicable (McDermott et al., 1997).

The fundamental view driving reform was that government bureaucratic structures were inappropriate for direct management of transportation, due to slow decision-making, conflicting goals, (i.e. between fiscal responsibility

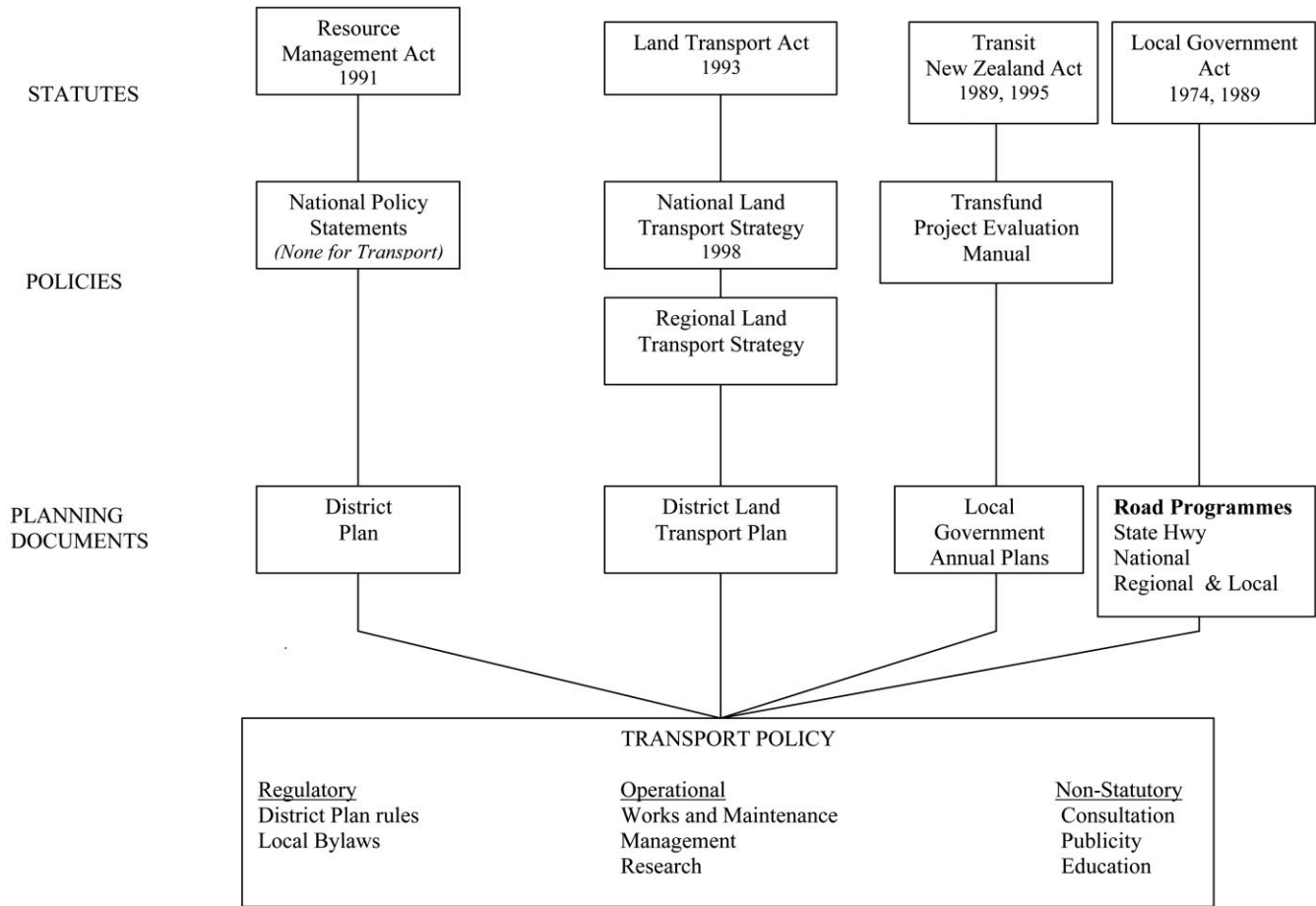


Fig. 1. Framework for transportation planning in New Zealand.

and political mandates) among other things. Government transportation operations were transformed to operate according to commercial, profit-seeking norms. Once commercial operations were satisfactorily established, they became candidates for privatization.

By mid-decade, this process was largely complete in the aviation, maritime sectors and rail sectors, and it was mostly complete in the urban transportation sector. The new transportation companies have generally achieved their initial operating targets, while maintaining or improving service. As government withdrew from operations, commercial regulation of transportation—e.g. pricing and policing restricted practices—became the domain of the Ministry of Commerce, which has managed lightly. In 1997, the government announced its intention to commercialize road services (Ministry of Transport, 1997); this initiative has stalled.

Epitomizing the changes of the past decade, the New Zealand Ministry of Transport (MoT) has shrunk from more than 5000 to about 50 employees since 1987. While some functions of the MoT were reassign other government agencies, most have been taken up by private-sector firms or state-owned enterprises organized along commercial lines. Effectively, short and medium term transportation planning has been left to local and regional government, and trans-

portation operations turned over to the private sector (McDermott et al., 1997).

2.2. Devolution and the legal framework for regional transportation planning

The structural framework for transportation planning and funding in New Zealand is outlined in Fig. 1. Since 1991, all physical planning, including transportation infrastructure and operational planning is governed by the Resource Management Act (RMA). The RMA is New Zealand’s comprehensive environmental planning law, replacing 75 pieces of legislation. This simplification also represents a streamlining of environmental regulation from the perspective of the New Right (Gleeson, 1994).

The RMA basically devolves planning powers to the local and regional levels. While there are provisions for national policy statements and national environmental standards, these have been slow to evolve, and none exist regarding transportation. The RMA is intended to promote the ‘sustainable management’ of resources. In essence this means using natural and manmade resources—e.g. transportation systems—in such a way and at such a rate so as to preserve the integrity of the resource for use into the

indefinite future. Local and regional governments are charged with promoting sustainable management by setting environmental standards for the effects of economic and social activity. Rules defining unacceptable environmental effects are defined in district and regional plans.

The RMA is much less prescriptive than the town planning legislation that it replaced. In theory, any land use is permitted, provided the environmental effects are made acceptable by locally-determined standards. By setting environmental standards and imposing compliance costs on users of land and other resources, the RMA in theory forces the internalization of the costs of environmental externalities.

Theoretically the RMA also mandates coming to grips with the environmental impacts of the transportation system and its expansion much more directly than in the past. The magnitude of some impacts has been systematically investigated. The Ministry of Transport's Land Transport Pricing Study (1996) estimated the external costs of vehicular emissions (including noise) at NZ\$1.4 billion (US\$700 million).

However, many environmental effects of motorized transportation are still routinely ignored, including vehicular emissions. Other environmental externalities (e.g. urban form effects, community severance effects) have not been systematically analyzed, yet are significant.

Environmental impact assessments of new road projects in New Zealand to date have largely omitted these more difficult-to-measure, wider-ranging and longer-term consequences, focusing only on narrow corridor impacts. Loop-holes in the RMA (e.g. it cannot effectively regulate vehicle emissions) led a Parliamentary Committee in 1998 to conclude that the RMA as it stands is insufficient for managing the impacts of land transportation (New Zealand House of Representatives, 1998).

On July 1, 1996, Transfund New Zealand was established under the Transit New Zealand Amendment Act 1995. Transfund is now an independent, non-commercial, central government agency. Its principal mission as defined in this legislation is to: "allocate resources to achieve a safe and efficient roading system" (Section 3B, Transit New Zealand Amendment Act 1995).

Transfund is responsible for funding land transportation, disbursing road user charges, vehicle registration fees, and fuel tax revenue among the bodies responsible for the development and operation of the nation's roads, specifically:

- Transit New Zealand, a non-political government agency responsible for developing and operating the 10,500 km State Highway network;
- Regional councils, responsible for regional transportation planning and for funding public transportation;
- Local authorities, with responsibility for local road networks.

Thus, the funding of the state highway system is separated from responsibility for its operations.

Local Government Act amendments in 1989 reduced the number of local government agencies from over 600 to fewer than 100. New Zealand now has 70 local territorial authorities, whose powers over land use and local road provision correspond to city and county government in the USA. There are 16 regional councils (including four that also function as local governments). The Regional Councils have been redefined under the Local Government Act Amendment of 1989 to correspond largely to river catchments and other natural boundaries, and, indeed most of their non-transportation functions relate to natural resource issues, e.g. soil, water, and eco-system management. Regional Councillors are elected and councils have the authority to levy rates (property taxes).

The Land Transport Act 1993 requires each Regional Council to prepare a Regional Land Transport Strategy (RLTS) that identifies future transportation needs and appropriate and environmentally sound roles for each transportation mode in the region. More specifically, a Regional Land Transport Strategy:

1. Identifies the future land transportation needs of the region;
2. Identifies the most desirable means of responding to such needs in terms of safety, cost-effectiveness and environmental impacts;
3. Identifies an appropriate role for all land transportation modes, including freight and non-motorized modes;
4. Identifies the best means of achieving objectives identified in 2 and 3 above;
5. Includes any regional passenger transportation plan; such plans must be prepared by any regions contracting for and subsidizing public passenger transportation.

Implementation of the RLTS is to be via regional and district land transportation programs (with the former containing both road and public transportation elements, the latter road-related projects only). The national and transportation program developed by Transfund NZ is "to have regard" to all regional land transportation strategies. Nothing in the strategy can be inconsistent with the RMA 1991 (Wellington Regional Council, 1995).

2.3. Commercialization and privatization of urban transportation

Urban and metropolitan surface transportation was not exempt from the drive to commercialization. Since 1991, all public transportation, hitherto largely a public operation, has been privatized. Government policy now mandates strict separation of transportation funding agencies from providers in urban transportation. As a result, local road construction and maintenance divisions have been largely separated from local road controlling authorities, which fund roads (Watson and Brennan, 1996).

In many instances, there are now no limits on the number

of public transportation operators. On routes where a Regional Council perceives a public need to maintain certain service levels, exclusive contracts are let, but these are subject to competitive bidding. Only private firms may bid for such contracts; no level of government is allowed to own or operate public transportation facilities, including fixed and rolling stock.

As the legislative mandates for privatization and competition took hold, central Government cut back its subsidy of public transportation. In 1991 dollars, central Government operating assistance fell from NZ\$85 million in 1986 to \$50 million in 1991 and NZ\$37 million in 1998 (Rutherford and Freke, 1993; Transfund, 1998).

In Auckland, this reduction in subsidy was associated with a dramatic drop in modal split, between 1986 and 1996; public transportation's regional share of work trips fell from 14.7 to 8.0%. Other factors besides the subsidy reduction were at work during this period, e.g. an economic downturn that hit Auckland's CBD, a major destination, hard, and dramatic declines in the cost of owning and operating a car, due in part to reductions in car import tariffs (Auckland Regional Council Land Transport Committee, 1995, 1998).

To date, the Auckland Regional Council's experience with privatization of public transportation indicates mixed results: Competitive tendering has seen unit costs decline, but there have been problems maintaining reliable and consistent service. Inter-operator coordination has proven an elusive goal, overwhelmed by inter-operator competition. Service improvements and innovations have been rare to date (Rutherford and Freke, 1993; Mein, 1995, 2000). Acquisition of the public bus operator and the major commuter ferry company by the Scottish firm Stagecoach in 1998 has presented a few difficulties, e.g. there were several strikes over working conditions in late 1999 (Collie, 1999).

Privatization of public transportation has also produced some qualified optimism: according to Stagecoach's NZ manager: the Auckland region has the right "mix of companies and local bodies" to meet the private firms' goal of doubling the number of public transportation users by 2005 (McSherry, 1999).

At the other end of the North Island, in Wellington, Stagecoach's operation of urban buses had been a success in most respects (Kerr, 1996):

- Ridership increasing faster than population growth;
- Fares maintained at 1990 level, a 10–15% decline in real terms;
- Annual subsidies have declined from \$14 million to under \$5 million;
- Improved service quality and routes;
- Stagecoach spent \$20 million on 80 new diesel buses in 1996–1997.

It should be noted that population and employment densities combine with topography to make Wellington a more

natural public transportation market than the more thinly spread and rapidly decentralizing Auckland. The experience of these two major centers suggests that privatization can be effective in increasing the efficiency of service delivery in a well-developed public transportation market. Privatization does not appear adequate in itself to enhance public transportation service.

2.4. Regional agency hopes and dilemmas

Wide regional consensus has been attained in both Auckland and Wellington on their land transport strategies. Each region's strategy aims to promote alternatives to single-occupant vehicles and revolves around focusing both future growth and passenger transportation services into existing and emergent rail and bus corridors.

Regional strategies must be legally consistent with national policies, here central government has elected to take a minimalist approach: A 700-word National Land Transport Statement issued in late 1998 contains little new guidance for local and regional government. It mainly reiterates prior central government mandates for a 'level playing field', which is to be achieved by identifying and charging users full costs (including environmental and social externality costs) of transportation for all modes.

Both the Auckland and Wellington RLTS feature project 'wish lists' costing hundreds of millions of dollars beyond foreseeable funding. While neither region has finalized its prioritization scheme, considerable local agreement to incrementally implement the strategies via component 'packages'—larger than a single project, smaller than the whole RLTS (Daniels, 1999). There is also some willingness among voters in both regions to match additional funds with locally generated revenues, e.g. parking charges and other surrogate charges for vehicle use, and regional petrol taxes, which central government would need to authorize. (Wellington Regional Council, 1996).

Presently, central government funding is disbursed nationally on a project-by-project basis based on Transfund (formerly Transit) New Zealand benefit–cost analysis formulae, which historically have favored short-term safety and bottleneck relief projects. Longer term, and multi-stage projects are hampered by Transfund's high 10% discount rate and a 25 year time horizon; both serve to discount very long-term project benefits. Motorist costs (travel time and vehicle operating costs) and accident cost savings still dominate most analyses.

Since 1997, alternatives to highway construction can compete for central government funding once reserved for roads. The Transit New Zealand Amendment Act 1995 (Section 3D(b)) identified allowable alternatives: "passenger services, rail transport, and maritime transport [defined to include] the carriage of freight and the carriage of passengers." This change indicates a redirection of transportation planning from incremental extension of the highway system

to the consideration of mode and sector alternatives for achieving particular transportation goals.

Slow progress towards a broader view of transportation projects and their impacts is under way in New Zealand. Transfund has significantly modified the benefit–cost technique historically used by Transit New Zealand to evaluate highway projects (Transfund New Zealand, 1997). While some road-bias remains (e.g. Transfund requires alternative projects be compared to a baseline highway project) methods for incorporated the costs of noise, air pollution and other externalities are now delineated. Physical and social infrastructure costs due to urban sprawl or consolidation effects may also be incorporated, though no set procedures have been developed to evaluate these.

Regional Councils, already required by the Land Transport Act to determine and set regional transportation priorities through the preparation of Regional Land Transport Strategies, would like to see the RLTS become the basis for funding applications from Transfund. Both the Auckland and Wellington strategies feature many non-road projects, the most substantial of which are new urban rail initiatives on existing rail lines. Regional Councils are also seeking greater transportation funding for their regions (e.g. proportionate to their population or tax contribution) and more flexibility in how such funds are used. In the case of Auckland, a regionally controlled NZ\$1 billion fund for transportation and other infrastructure ('Infrastructure Auckland') was established in 1998. This fund was created from the forced sale of transportation facilities and operating entities owned by the precursor to the ARC.

Thus, as central government retreated from direct policy-making in the 1990s, Regional Councils in Auckland (as well as Wellington and Christchurch) stepped into the breach. Regional agencies have successfully forged a consensus among local governments regarding desirable multi-modal regional transportation strategies. The regions are also united in pressuring central government for greater and more flexible funding to finance these regional transportation strategies.

3. Chile

Chile spans the southwest coast of southern South America, stretching over 4000 km from north to south. There are 13 administrative regions, including the Santiago Metropolitan Region, which contains approximately one-third of the population and disproportionate shares of industrial output and urban infrastructure. Past attempts to decentralize its activities to other cities and regions have been muted, and current urban policy favors investment in Santiago. Consequently, the capital city's congestion levels and environmental concerns dwarf those of other Chilean cities.

Socioeconomically, Chile ranks favorably among Latin American nations, with relatively high literacy rates, low

fertility rates and good access to basic services. Most services are focused on urban areas, which contain 80% of the population. Since the late 1980s, the country has experienced rapid economic growth as a result of successful wine and fruit exports and high copper prices.

In 1990, a democratically-elected government, led by Patricio Aylwin, was established after 17 years of military dictatorship. Subsequently, numerous programs to improve urban services for the entire population were implemented. The government began encouraging public participation in urban planning and investment decision-making.

3.1. Transportation policy in Chile

Historically, most of Chile's investment in urban transportation has been concentrated in Santiago, making it a center for innovation. In 1857 a horse-drawn streetcar system was deployed, one of the first in Latin America. Subsequent innovations included electric streetcars in the 1890s and motor buses a few decades later (Parrochia, 1980). Economic growth significantly increased private car ownership in the 1920s, resulting in congestion on many of central Santiago's narrow streets. The Brunner Plan of 1935 attempted to accommodate cars via improvement of existing city streets, construction of radial arterials and establishment of parking lots; however, the plan did not seek to organize or coordinate public transportation.

The worldwide depression of the 1930s both slowed car purchases and reduced streetcar patronage in Santiago. During the 1940s, the state took over part of the troubled streetcar system, intervening in an industry that had been exclusively in private hands. Private bus routes replaced streetcars by 1960. During the 1950s, demographic growth, the proliferation of the private automobile (see Table 1), and a lack of control over the planning of the bus system significantly worsened congestion in Santiago.

In response to this crisis, the *Plan Intercomunal* (or Regional Master Plan) was approved in 1960. The transportation element of this plan called for the establishment of a transportation network in each *comuna* (district) and the integration of these networks into a larger, metropolitan network.

In 1964, President Eduardo Frei Montalva hired a consortium of private consultants to study future transit alternatives. The consortium's 1968 *Plan Regulador de Transporte*

Table 1
Evolution of vehicle ownership in Chile (Sources: Parrochia, 1980; Zegras and Litman, 1997)

| Year | Number of vehicles | Vehicles per thousand population |
|------|--------------------|----------------------------------|
| 1945 | 29,500 | 5.1 |
| 1952 | 48,600 | 8.0 |
| 1970 | 152,000 | 17.1 |
| 1985 | 624,000 | 52.0 |
| 1996 | 1,650,000 | 117.9 |

(Regulatory Transportation Plan) for Santiago proposed the construction of a five-line metro and emphasized the importance of establishing a set of measures to integrate the Metro with other modes. Some highway and subway-related elements were initiated by 1970, but the original *Plan* was never fully implemented. Most transit routes were left unaltered.

In the 1970s, the military dictatorship embarked on a campaign to privatize a number of industries in Chile, further limiting the responsibility of the government in the provision of social services. In the area of transportation, most transit services were already in private hands when the dictatorship seized control in 1973. The urban bus sector, which carries over 65% of all trips in Santiago, was comprised primarily of numerous, small bus companies. A state-run bus company, ETCE, was driven out of business in 1978.

The dictatorship deregulated bus services, and fostered development of deregulated shared taxi services during the 1980s. Bus companies could effectively change fares at will, enter the market with almost no warning and forego serious vehicle inspection. Eventually, powerful companies established route associations along certain urban corridors to control prices, much as a cartel would. Aggressive behavior and predation were two results of this policy. Meanwhile the state-run Metro operated in isolation of all other modes.

Since 1990, there has been re-regulation of the bus sector. To reduce congestion (e.g. the proliferation of buses and other vehicles in Downtown Santiago), the Aylwin Administration (1990–1994) implemented a route tendering plan, issuing licenses to only a limited number of bus companies meeting specific performance characteristics (e.g. low polluting vehicles, technological advancements, integration with other modes). Private operators are required to provide fixed routes and frequencies, but can periodically raise fares relative to the national consumer price index (CPI). With the simultaneous expansion of the Metro, this emphasis on the efficient provision of public transit services has expanded alternatives to the private automobile. However, motorization has continued to rise, albeit at a slower pace.

Under the Eduardo Frei Ruiz-Tagle Administration (1994–2000), a number of highway projects were contracted out to private firms through a bidding process. Results were reported to be positive and project delivery was relatively punctual. For example, El Melon, a new tunnel on the Pan-American Highway (linking Santiago to La Serena and points north) greatly reduced one-way travel time and increased safety.

The Ricardo Lagos Administration, which assumed power in 2000, appears to favor accommodating greater public participation in local planning issues, while continuing to implement transportation plans approved under his predecessor. However, some sources claim that the concession process has assumed an increasing role in the development of new transportation infrastructure, placing a good deal of power in the hands of the private sector.

3.2. Regional transportation planning dilemmas

An effective system of regional transportation planning has been an elusive goal throughout Chile's recent history. Autonomous regional planning was proposed under Salvador Allende (1970–1973), but the ensuing military dictatorship granted little power to the regions; its laissez faire policies effectively strengthened Santiago as the primate city. Since 1990, the Aylwin, Frei, and Lagos governments have attempted to address the mobility needs of Santiago (see Fig. 2), Valparaiso and Concepcion; however many projects are still funded by the central government and are subject to scrutiny. Despite the creation of such regulatory agencies as the National Commission for the Environment (CONAMA), legal, financial and institutional instruments for implementing the Santiago Regulatory Plan are lacking.

3.2.1. Santiago's transportation policy

The *Plan Regulador de Santiago* (Santiago Regulatory Plan), approved in 1994, followed through with earlier commitments to update comprehensive planning efforts in Chile's three largest cities (Ministerio de Vivienda y Urbanismo, 1994). Effectively, it did the following:

- set urban growth limits;
- developed subcenters to improve distribution of services;
- promoted increased densities throughout most urbanized areas; and
- encouraged fossil fuel conservation.

More problematically, the *Plan Regulador* proposed to satisfy increased travel demand through an expansion in road capacity and identified roadway improvements that could only be financed by the individual metropolitan municipalities (Rivasplata, 1996).

In response to growing concerns about the efficacy of the *Plan Regulador* and the future of transportation in Santiago, SECTRA, the National Agency for Transportation Infrastructure, drafted a *Plan de Desarrollo del Sistema de Transporte Urbano* (Urban Transportation Plan) for Santiago in 1995. This US\$2 billion investment plan called for transportation system improvements, including: segregated lanes for buses; extension of the Metro system and improvement of the suburban train service; road expansion, including a program of urban road concessions; congestion pricing; and high-quality bus systems in auto dependent areas (SECTRA, 1995).

While this urban transportation plan offered road and public transportation strategies for providing mobility, it did not take the external costs of transportation facility construction on the local environment into account. A few metropolitan and local planning agencies are now creating mechanisms to reduce these externalities.

3.3. Devolution of planning powers to regions

In Chile, the central government has historically played

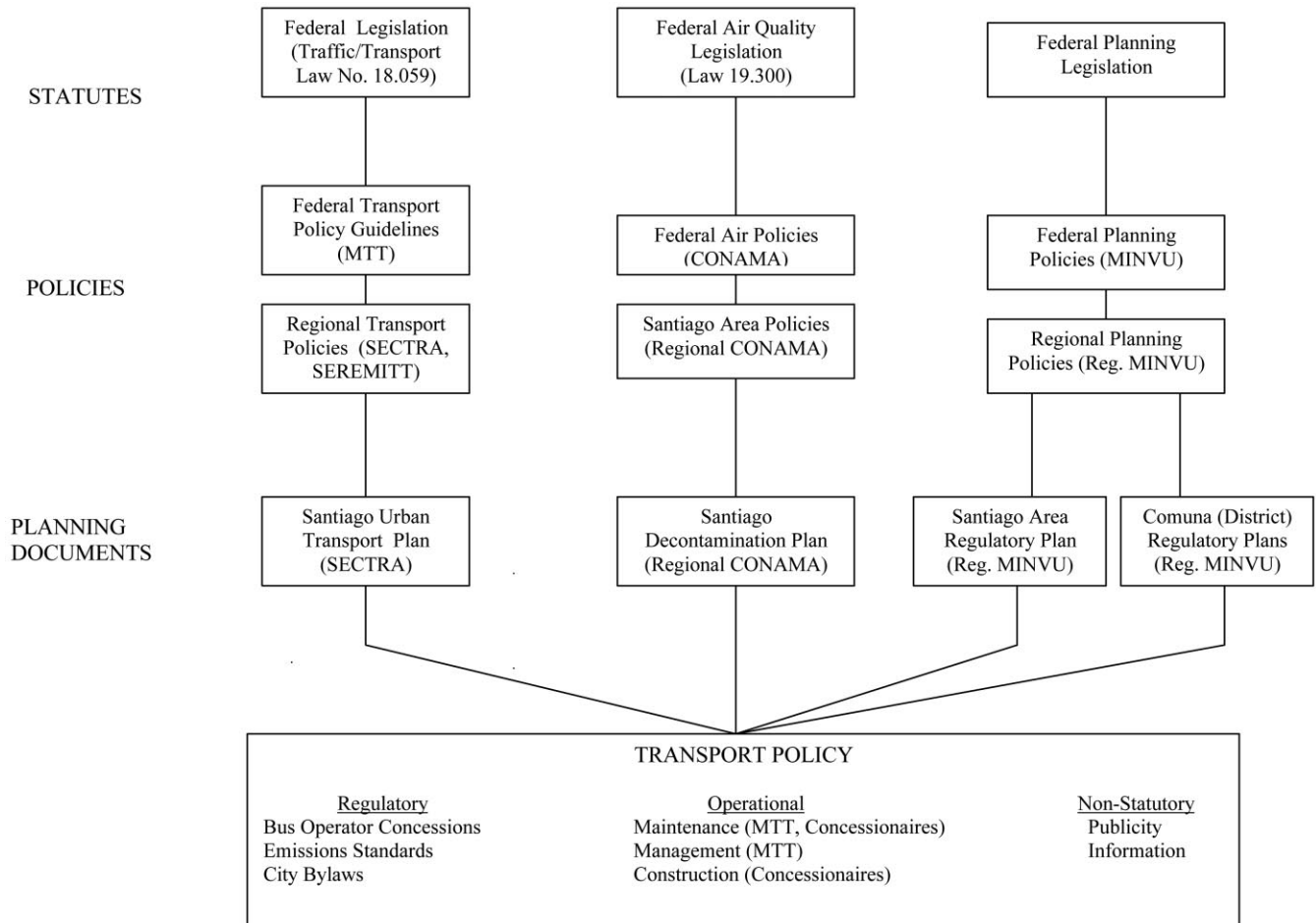


Fig. 2. Framework for transportation planning in Chile.

an important role in the planning and development of transportation infrastructure. Since the early 1930s, local jurisdictions have been required to develop regulatory plans (Sabatini and Soler, 1995). However, powerful private real estate interests have been more influential than the plans themselves. Only recently has plan development and adherence been tied to major investments in roads and fixed guideways (Ducci, 1998). Historically, transportation investment decisions occurred at the national level, with little local input. Moreover, local jurisdictions had very limited taxing authority to fund transportation projects.

Since 1990, the Santiago area and some of the larger regions have been given responsibility for developing their own planning schemes. The Ministries of Transportation and Planning have established semi-autonomous regional sub-ministries charged with implementing a broad set of planning policies that theoretically advocate increased mobility, the use of available resources and better utilization of existing resources. Legal and administrative reforms provide regional governments with financial resources: the National Fund for Regional Development (FNDR) now represents almost one-third of all public investment in Chile (Abalos, 1998). Particularly in Santiago, increasing

autonomy has been granted to regional authorities, allowing them to more effectively plan regional transportation projects.

While there are formidable efforts to reduce future environmental degradation in metropolitan Santiago, the planning process is still strongly influenced by large landowners and corporations. Due to the novelty of the participatory process, these forces are capable of pushing through developments with minimal public input. For example, despite the approval of aggressive, regulatory master plans for numerous municipalities and the Greater Santiago area, there have been recent attempts to dissolve urban growth limits around Santiago. Large development companies have also encouraged municipalities 10–15 km away from the urban edge to expand their urban spheres so that they effectively border Santiago and become an outgrowth of the latter.

Another well known case is the Costanera Freeway, proposed to link affluent districts of the capital and the airport by tunneling through the southern flanks of San Cristobal Mountain, and passing through the middle to lower-class neighborhoods of Bellavista and Recoleta. Affected residents have vehemently opposed the project and have

obtained court injunctions to halt construction, but the final outcome is uncertain. Without a genuinely open participatory process, the value of regional autonomy appears questionable.

3.4. *The air quality plan for Santiago*

Due to chronic air quality problems in the 1980s, the Metropolitan Region Intendente ('regional governor') began imposing vehicular restrictions in Santiago. When poor air quality conditions were expected, vehicles with certain license plate numbers were banned from circulation. While this measure slowed the increase of emissions in Santiago, air quality worsened, prompting Congress to adopt Law 19.300. This federal law requires that a Decontamination (or Air Quality) Plan be initiated within 90 days of a determination that saturation levels had been exceeded. CONAMA is responsible for developing these plans, and in 1996, its Metropolitan Region office released the newly adopted the *Plan de Descontaminacion* (Decontamination Plan) for Santiago (CONAMA, 1996). This document included provisions to reduce pollution from a number of different sources. In the area of transportation, four strategies along with their respective lines of action, were presented:

- Reduce vehicle emissions in Santiago through new and used vehicle programs, and alternative fuel programs;
- Define policies to reduce transportation emissions in bus operations, taxi/shared taxi operations, freight vehicle operations, and auto use (e.g. road, parking pricing);
- Incorporate environmental variables in transportation planning;
- Avoid new motorized trips through better access to bicycle and pedestrian facilities, better coordination between land use and transportation investments, and introduction of travel demand management plans.

The Air Quality Plan for Santiago is perhaps indicative of the future role of regional planning and governance, i.e. control of market forces and the creation of incentives for efficient services and desirable development. Rather than continue to push for roadway congestion pricing schemes that continue to favor development along the urban periphery, the government may be moving toward strategies that charge the user fairly and fully for travel by a particular mode (e.g. gas tax, circulation permit). A number of local groups continue to advocate alternative strategies to more fully incorporate environmental concerns into transportation decision-making (Zegras and Litman, 1997).

4. California

California covers more than 400,000 square km and is the most populous state in the USA. Though still the nation's most productive agricultural state, California is over 90%

urban and is a major center for the computer, aerospace and tourism industries.

Over 40% of California's 34 million residents live in the Southern California megalopolis centered on Los Angeles; another 20% reside in the greater San Francisco Bay Area. Both of these conurbations are among the six most populous urban markets in the USA. In addition, the state contains two other conurbations of more than 1 million inhabitants (San Diego and Sacramento).

4.1. *Federal transportation policy in the 1990s*

While urban mobility patterns in the USA. paralleled those of many other European countries from 1850 to the early 1900s, the second half of the 20th century was characterized by a trend toward increasing dependency on the private vehicle. Up until the 1990s, federal transportation funding favored continuous expansion of the federal and state highway systems, strengthening dependence on the automobile. Government assistance for bus and rail services began on a large scale in the 1960s as private operators failed at an alarming rate.

In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA), which significantly changed the federal framework for transportation planning in the USA. This legislation allowed for greater funding flexibility between highway and transit projects and enhanced the role of regional transportation agencies (e.g. The Metropolitan Transportation Commission or MTC in the San Francisco Bay Area) in determining how monies would be spent. Regional transportation plans were required to be financially constrained, based on realistic revenue assumptions rather than a wish list of projects (US Department of Transportation, 1998).

In 1998, Congress reaffirmed its commitment to regional transportation planning through approval of the Transportation Equity Act for the 21st Century (TEA-21), which reauthorized the investment strategies introduced under ISTEA. Essentially, the new bill maintains the structure of ISTEA while considerably increasing funding levels (US Department of Transportation, 1998).

4.2. *Regional transportation and air quality planning in the San Francisco Bay Area*

California has long practiced regional transportation planning. As a result of burgeoning auto-dependent growth over the past 60 years, California has enacted numerous measures to mitigate the negative impacts of automobile use. Highway capacity has not kept up with increasing travel demand since the 1970s (Taylor, 1995) and throughout the state, belief in the feasibility of a roads-only solution in urban areas diminished during the 1980s for both economic and environmental reasons. This situation prompted local and state authorities to seek alternative strategies for controlling demand through the enforcement of strict air

quality requirements and the development and promotion of alternative (non-auto) modes.

In addition to ISTEA/TEA-21 transportation legislation, air quality laws fostered regional attempts to improve transportation planning in California in the 1990s. At the outset of the decade the Federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), were amended. The new legislation forced regional air districts unable to meet air quality standards adopt, implement and enforce Transportation Control Measures (TCMs). TCMs are strategies to “reduce vehicle use and traffic congestion for the purpose of reducing vehicle emissions” within the region (Bay Area Air Quality Management District (BAAQMD), 1991). These measures included the expansion of employer assistance programs; the improvement of transit service, information and assistance; and the improvement of highway traffic management.

In the Bay Area, where motor vehicles produced about 85% of the carbon monoxide and 50% of the ozone precursors in the region, a set of 21 TCMs were jointly identified by the BAAQMD and the MTC in 1991. TCMs sought to modify travel behavior by promoting alternative modes of transportation, better integration of surrounding land uses and the development of disincentives to driving. While some of these measures were implemented, many proved politically infeasible in the near term (e.g. congestion pricing).

One measure, establishment of a regional, employer-based trip reduction rule, was aggressively pursued. Codified as Regulation 13 (1992), employers with more than 100 workers at a specific work site were required to establish a travel demand management (TDM) program to reduce solo driving. Local jurisdictions were responsible for ensuring that these programs were implemented, and trip reduction ordinances were passed in many communities.

The BAAQMD was able to learn from many of the experiences and constraints faced by the Los Angeles air district (South Coast Air Quality Management District) after the latter introduced a similar trip reduction regulation (Reg. XV) in 1987. The BAAQMD emphasized public participation and direct contact with local jurisdictions and major employers in the region through a series of public hearings and workshops at locations throughout the region. Once the regulation was adopted, the air district maintained contact with employers and local governments in order to respond to any additional concerns. Thus, through the introduction of these TCMs, regional agencies played a key role in the development of air quality-related measures that also promised to reduce traffic congestion.

Many regionalists welcomed these air quality measures as a catalyst for regional transportation planning. Others questioned certain of the measures, preferring a focus on policies and measures that could reshape urban form to create a better match between the spatial distribution of activities and alternative transportation modes (Wachs, 1993). Before TCMs could fully prove themselves, legislation supported by disgruntled employers in the Los Angeles

area outlawed mandatory employer-based trip reduction in 1995. Transportation planning based on air quality goals had received a major setback.

4.3. *Subregional congestion management in California*

In 1990, as regional air districts introduced regulations aimed at reducing automobile emissions through reductions in auto use, state voters passed legislation requiring congestion management at the *subregional* (county) level. While many smaller urban regions are single-county, the Bay Area encompasses nine counties and greater Los Angeles five counties. State Propositions 108 and 111 called for urban counties throughout the state to develop Congestion Management Programs (CMPs) to qualify for augmented state funding of transportation projects. Attracted by this incentive, counties quickly created Congestion Management Agencies (CMAs). Some counties had already created *de facto* CMAs to administer County-level transportation related sales taxes (i.e. GST).

In essence, the CMP was originally designed to serve as a sort of ‘report card’ on the state of mobility in each urban county. CMPs established road and transit systems and service standards for each, provided data on roadway and transit conditions, and identified strategies for improving overall system performance. These documents were required to include both a Land Use Monitoring Program and a seven-year (changing to four-year in 2000) Capital Improvement Plan (CIP) coinciding with federal and state funding cycles. Roadway Level of Service (LOS) data was mandated for determining system deficiencies, though multi-modal measures could be used, especially for evaluating proposed projects (MTC, 1995). In many cases, transportation modeling work was employed in the development of CMPs. The quality of these plans often depended on the level of cooperation that a county could get from the incorporated cities lying within it. (Cities control land use decisions within their boundaries; Counties control land use only in unincorporated areas).

The Congestion Management process granted considerable autonomy to each CMA in the development of baseline data and priorities for controlling travel demand. This is understandable, since some counties were involved in congestion management issues before the passage of state legislation. Such counties also found it relatively easy to raise local funds for specific projects in their capital improvement plans. For example, the Santa Clara Valley Manufacturing Group, an organization representing the transportation interests of some of the more influential Silicon Valley companies, began to address a number of mobility issues in the 1980s. Its ability to convince local (e.g. municipal) authorities to back transportation/land use planning in the Golden Triangle (northwestern Santa Clara county) secured local funding for CMP projects.

Initially, CMP guidelines defined congestion and congestion relief strictly in terms of roadway delays;

however counties wishing to emphasize other modes have been allowed to tailor their congestion measures. In San Francisco County, for example, cost-effective transit service is available and therefore, programs focused on transit monitoring and improvement are central to CMP strategies. In auto-oriented, suburban counties, the original legislation linking transportation funding decisions to measurable traffic congestion, land use decisions and the implementation of transportation control measures appears to be appropriate.

4.4. *Regional and subregional interplay*

In its role as Metropolitan Planning Organization (MPO) for the Bay Area, MTC has been granted a moderate degree of regional autonomy, particularly under ISTEA and TEA-21. For example, MTC has been responsible for evaluating the consistency between the individual CMPs and the Regional Transportation Plan (RTP). Thus, in order to receive state funding for transportation, urban counties in the Bay Area must develop CMPs that reflect the unique set of transportation goals and objectives of the region and resolve any inconsistencies arising between CMAs of different counties. In addition, metropolitan CMAs may submit project proposals for consideration by MPOs in developing the financially-constrained RTP. A critical issue facing CMAs in their efforts to autonomously develop and fund subregional mobility projects that has been the limited availability of funds for such activities as expanding transit services.

Furthermore while CMP legislation purposely allowed for a great deal of freedom in determining the methodology employed in the process, it provided no dedicated funding for CMA operations, leaving them to rely on local revenues. Where some form of transportation and land use planning had been practiced before, it appears that this devolution of powers without funding was in fact, beneficial. Elsewhere it has been hard for new CMAs to establish significant influence. Dedicated funding does not appear likely. Indeed, in 1996 California Assembly Bill (AB) 2419 allowed counties to opt out of the CMP process. To date, however, few counties with large cities (i.e. over 250,000) have opted out, suggesting that the merits of the CMP have been internalized in the more urbanized counties.

4.5. *Limited privatization of transportation services*

Private contractors in California generally perform construction and maintenance of roadways, and there have been several privately funded tollways in Southern California. However, most public transportation providers remain government-owned. A major exception is in the area of specialized transit (e.g. services for the disabled) and smaller urban and suburban transit, where limited privatization has been permitted.

In privatizing specific services, local transportation agencies and districts have generally sought to improve performance along certain transit routes or corridors and to lower

public subsidies. Many politicians assume that private companies can more efficiently meet specific performance objectives. Such expectations have often been met, but questions remain. Should non-union operations be used? Can transit operators effectively administer service contracts in a responsible, consistent manner, particularly where the public sector remains heavily involved in service provision? Compared to New Zealand or Chile, privatization of public transportation has been limited.

4.6. *Regional and local dilemmas*

In California, municipal home-rule has legal authority over regional initiatives. MPOs thus face major dilemmas in guiding the transportation of their regions. In the Bay Area, while MTC is responsible for guiding the development and coordination of services, and strengthening the linkages between transportation investment and land use planning, it claims little power over local land use, private sector transportation decisions, and interregional traffic. Thus, MPOs are caught between the prescriptive guidelines of the highway-oriented state transportation agency (Caltrans) and local development interests in cities and counties. While federal mandates contained in TEA-21 legislation have strengthened the position of MTC in financing regional initiatives, the State of California has strengthened countywide or subregional transportation planning (see Fig. 3).

Recently, the state has developed some regional initiatives that attempt to provide a balance between the interests of local governments and the state. One such initiative, California Senate Bill (SB) 1474, was adopted in 1996 to increase the level of regional coordination between transit operators. For example, in the Bay Area, this bill now allows MTC to withhold funding from operators that do not participate in regional planning forums.

Other state initiatives have included a regional gasoline tax aimed at reducing auto use, i.e. supporting use of alternative modes; and California Senate Bill (SB) 45, adopted in 1997. This landmark legislation guarantees localities and regions 75% of state transportation funding, and gives them primary responsibility in the selection and delivery of local and regional projects previously controlled by the state.

The consensus among CMA staff and observers interviewed is that the state has given counties sufficient flexibility to tailor their CMPs, particularly since the passage of AB 2419. In San Francisco, the CMA has used this flexibility to redefine congestion management as maximizing person, rather than vehicular, throughput, by effectively building on past investments in transit and pedestrian-oriented environments. Los Angeles County with more than 9 million inhabitants and a diversity of built environments, has adopted a 'toolbox' of congestion management measures, including land use strategies, capital improvements, and demand management. This county's 89 local jurisdictions can choose measures most appropriate to their situation. Between 1990 and 1997, local jurisdictions implemented more than 2400 toolbox strategies,

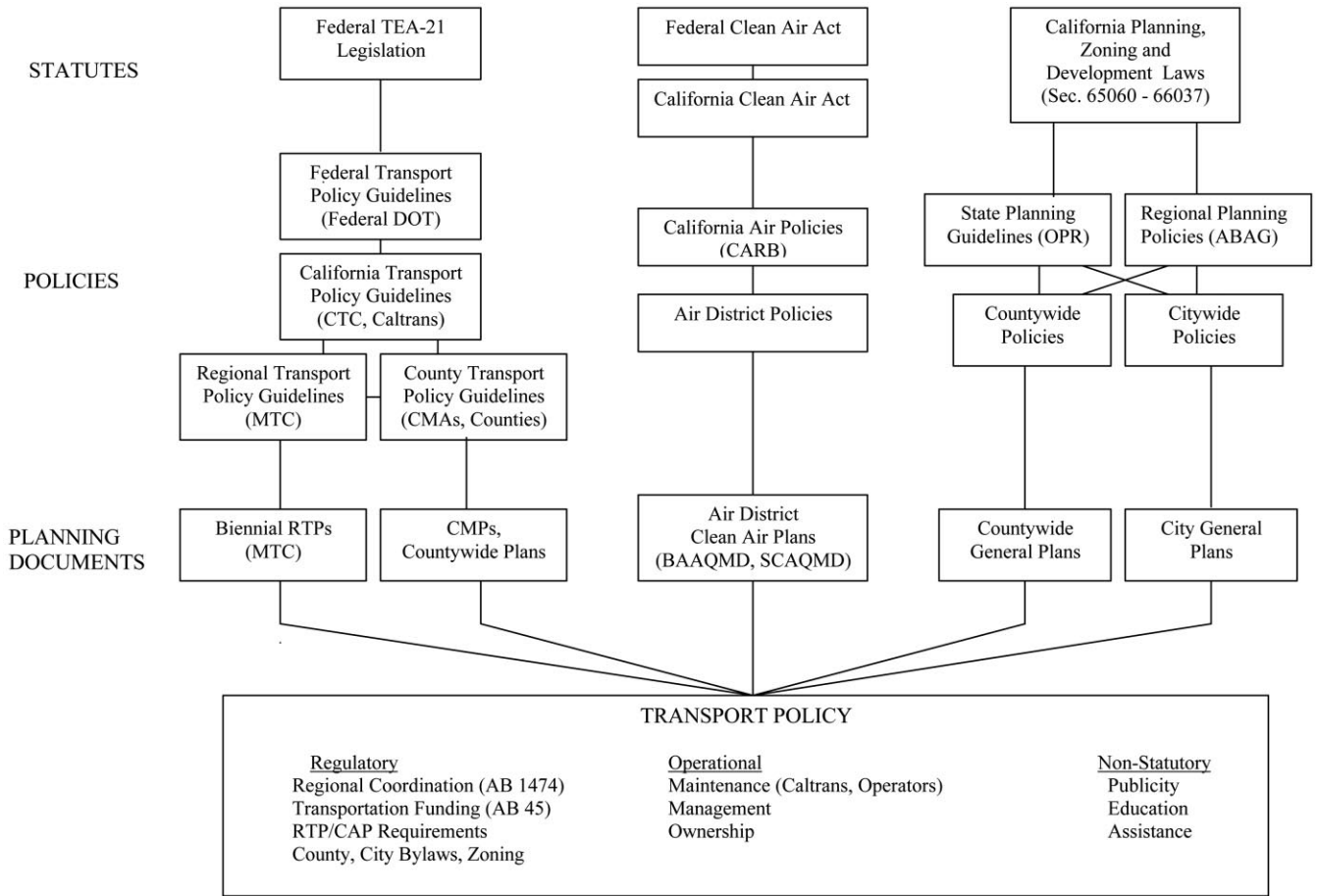


Fig. 3. Framework for transportation planning in California.

eliminating or accommodating approximately 3.3 million daily vehicle miles traveled. (Metropolitan Transit Authority, 1997, p. 84).

There has been a clear retreat from imposing mandates on individual municipalities, as exemplified by Santa Cruz County. Here the CMA has consistently cultivated political support for congestion management goals from constituent municipalities. In the major metropolitan areas the CMP has helped move the field of play to within the region, i.e. the key players are now regional and subregional agencies and local governments.

5. Conclusions

5.1. Key findings

While each of these case studies reflects unique circumstances, a number of parallels can be drawn. Common themes examined include:

1. Devolution of responsibility for metropolitan transportation planning to metropolitan and regional planning agencies.

2. Fiscal conservatism tending to reduce funding from central government.
3. Privatization of hitherto government transportation operations, with regional or subregional regulation of services.
4. Related to #2, but also arising from greater car use and congestion, a rise in the relative importance of regional, subregional, and local transportation planning and funding.

Collectively, these trends constitute a dilemma for Regional Transportation Planning agencies. They are increasingly responsible for transportation outcomes without having control of key ‘inputs’: e.g. actions of local and higher level government as well as those of the private sector. Another dilemma arises from the need to serve travel demand originating from beyond the region (e.g. long distance commuters).

Evidence from all three countries suggests that both transportation planning innovation and intergovernmental tensions have been created by the devolution of responsibility for transportation planning and project implementation to regional and local levels, especially when there is no parallel devolution of fiscal powers.

May (1993) classifies mandates from higher to lower government by the extent to which they are coercive

(mandating goals, policies and performance standards with little support for their attainment) versus cooperative (facilitating local articulation of planning goals and their attainment). To this might be added a third dimension: the provision of funding and other material support from higher to lower government. Movements along the ‘coercive-cooperative continuum’ are complex, but generally seem to be moving towards the cooperative model in each country studied.

This is particularly the case in California, where regional transportation plans and programs—highly subordinate to state highway planning before 1990—have evolved into true master transportation plans. Legislation such as TEA-21 and California SB 45 now allow regions and counties to establish local goals and objectives, with higher levels of government playing only an advisory role. Moreover, both federal and state legislation now mandate that most fuel tax revenues generated in the state’s urban areas be returned to them. Since most urban counties also have established their own transportation funds from sales taxes and other sources, the locus of transportation planning and *spending* in California has become overwhelmingly regional and subregional.

Where California has clearly lagged behind New Zealand has been in the privatization of public transportation services. Consequently efficiency gains exemplified by the virtually self-supporting nature of public transportation operations in both Wellington and Santiago have not occurred in California. Nor has California been as successful as Chile in the use of air quality mandates to effect transportation changes, though it is far ahead of New Zealand which to date has not effectively used air quality goals to regulate urban transportation.

In New Zealand, the Resource Management Act 1991 and simultaneous changes to transportation planning legislation and structures have clearly devolved responsibility for transportation planning to regional and local government. At the same time, a major restriction imposed on regional government in that it was denied the right to own transportation facilities and to operate transportation services. Regional councils in the major centers have accepted this ‘planning-only’ mandate and have adapted the Regional Land Transport Strategies to their particular needs. Auckland has been markedly successful in making the RLTS a vehicle for crafting a regional consensus on transportation issues and solutions. Auckland’s success has been facilitated by the fact that the forced sale of transportation and other public facilities has created a substantial regional fund for transportation improvements (Infrastructure Auckland).

New Zealand’s central government, through Transfund, still controls most transportation-related funding. Outside of Auckland, regions have no source of revenue for transportation other than rates. Although the current government has promised to enhance local and regional government control over roads and transportation (Labour Party, 1999) as of September 2000 regional councils still do not have the

authority to impose petrol or GST for transportation purposes. Control of transportation revenues has not been devolved in New Zealand.

In Chile, where the environmental review process is still new and public participation has only recently been encouraged, the move towards cooperative planning has been significantly slower. Despite recent advances toward regional autonomy, there is still evidence that central government is not reluctant to influence regional agencies as it still controls a majority of the national transportation infrastructure. Regional government in Chile does not have rating authority, i.e. the power to tax property *ad valorem*. Nonetheless, the fact that regions have been given nominal responsibility for one-third of the national infrastructure budget (via the Regional Fund for National Development) represents a significant achievement.

Chile’s comparatively low car-ownership prior to 1990 eliminated any need for privatization, since urban transportation remained viable in the marketplace. Government re-regulation of the urban sector seems to be both necessary and at least partly successful in maintaining public transportation’s viability in the face of rising motorization.

5.2. *Lessons for regional transportation planning*

What lessons may be drawn from the three cases? Given pressing metropolitan-scale transportation problems and both remoteness and reluctance on the part of central governments, it seems imperative that regional agencies be empowered to take the lead in both defining transportation planning strategies and in funding transportation projects. This should include authority to generate regional revenues for transportation enhancements. A strong case can also be made for central government providing supplemental funding at least proportionate to the rate at which transportation user fees are generated within the region.

Other lessons relevant on both sides of the Pacific are drawn including the need to integrate land use and transportation planning processes; and the desirability of integrating other planning processes (e.g. air quality planning) into transportation planning. In fiscally-constrained times, incompatible plans drawn up in isolation represent unacceptable inefficiency. A related issue, not fully explored in this article is the role of public participation; an increasingly important element as the number and diversity of communities using and funding transportation multiplies.

Our principal conclusion is that in three different Pacific Rim countries, transportation planning is becoming increasingly a regional affair. It is becoming so in part because of pressing phenomena such as more cars and car-related urban spread that are occurring globally, but that are felt locally. More directly it comes from central government moves to ‘get government out of government’, and related trends towards cutting central government obligations by devolving power from the center. In large part, the rise in regionalism was not willed by national governments. This

may be changing, as each jurisdiction elected center-left governments at the end of the decade, each nominally committed to greater regional autonomy.

While it is too soon to say whether or not the new governments are accelerating the trend, metropolitan agencies in each country are getting more responsibility, power and money for transportation. This does not mean regional authorities have sufficient resources, or that appropriate and effective regional and local policies have emerged to direct planning and investment. However an international trend seem established, wherein regional and subregional entities will have more of the money to do *something* about regional transportation dilemmas, with less direction from above on how to spend it.

Appendix A. Glossary of acronyms

Appendix A.1. New Zealand section

| | |
|--------------|--|
| ARC | (Auckland Regional Council): Agency that plans for transportation and other regional infrastructure for the seven local authorities in the Auckland region |
| ARLTC | (Auckland Regional Land Transport Committee): a standing committee of the ARC charged with writing the RLTS (see below) |
| NZHR | (New Zealand House of Representatives): the official name of New Zealand's unicameral Parliament |
| RLTS | (Regional Land Transport Strategy): A multi-modal long-range transportation plan required of all regional councils |
| RMA | (Resource Management Act): New Zealand's comprehensive land use planning and environmental protection legislation, enacted in 1991 |

Appendix A.2. Chile section

| | |
|---------------|--|
| CONAMA | (the National Commission for the Environment): air quality agency |
| CPI | (Consumer Price Index): economic indicator employed in fare modifications |
| ETCE | (State Collective Transportation Company): Santiago public bus operator in existence prior to 1979 |
| FNDR | (Regional Fund for National Development): agency providing investment resources to regional governments |
| MINVU | (Ministry of Housing and Urban Development): federal agency responsible for coordinating regulatory plans |
| MTT | (Ministry of Transportation and Telecommunications): federal agency responsible for setting national transportation policy |
| SECTRA | (National Agency for Transportation Infra- |

structure): federal agency in charge of funding transportation infrastructure improvements

SEREMIT (Secretariat of Transportation for the Santiago Region): regional agency in charge of executing local policies, plans and projects

Appendix A.3. California section

| | |
|-----------------|--|
| BAAQMD | (Bay Area Air Quality Management District): San Francisco's regional air district |
| CAA | (Federal Clean Air Act): legislation requiring that each state meet federal air quality requirements |
| Caltrans | (California Department of Transportation): state agency operating intercity highway and rail facilities |
| CAP | (Regional Clean Air Plan): regional plan to meet state and federal air standards |
| CCAA | (California Clean Air Act): state legislation containing standards that are more stringent than those of the CAA |
| CMA | (Congestion Management Agency): county-wide agency responsible for developing a CMP |
| CMP | (Congestion Management Program): a county-wide planning document required to qualify for state and federal transportation funds |
| CTC | (California Transportation Commission): state agency that sets funding priorities, allocations |
| DOT | (Federal Department of Transportation): agency that sets national transportation policy; responsible for implementing ISTEA and TEA-21 |
| ISTEA | (Intermodal Surface Transportation Efficiency Act): key 1991 federal legislation calling for a greater diversity of projects, modes, and better use of existing facilities |
| LOS | (Street/Highway Level of Service): tool for measuring roadway congestion levels |
| MPO | (Metropolitan Planning Organization): regional planning body responsible for transportation planning and project selection |
| MTC | (Metropolitan Transportation Commission): the MPO for the nine-county San Francisco Bay Area |
| RTIP | (Regional Transportation Improvement Program): regional priority list of highway and transit projects |
| RTP | (Regional Transportation Plan): 20-year plan to guide regional transportation planning |
| SCAQMD | (South Coast Air Quality Management District): Los Angeles' regional air district |
| STIP | (State Transportation Improvement Program): a seven-year CTC document that determines when projects will be funded by the state based on a review of RTIPs |
| TCM | (Transportation Control Measure): strategy to |

reduce vehicle use and its resulting impacts on air quality

- TDM** (Travel Demand Management): series of low-cost measures aimed at reducing single-occupant vehicle dependency
- TEA-21** (Transportation Efficiency Act for the 21st Century): 1998 update of ISTEA
- TIP** (Transportation Improvement Program): primary spending plan for federal funding of regional transportation projects

References

- Abalos, J.A., 1998. Descentralización Regional y Local: Un Balance Necesario. *Revista Latinoamericana de Estudios Urbano Regionales* 24 (73), 113–116.
- Auckland Regional Council Land Transport Committee 1995. Auckland Regional Land Transport Strategy, Auckland, New Zealand.
- Auckland Regional Council Land Transport Committee 1998. Draft Auckland Regional Land Transport Strategy 98, Auckland, New Zealand.
- Bay Area Air Quality Management District 1991. Bay Area '91 Clean Air Plan, BAAQMD, San Francisco.
- Borja, J., Castells, M., 1996. Local and Global: Management of Cities in the Information Age. Earthscan, London.
- Cervero, R., 1998. The Transit Metropolis: a Global Inquiry. Island Press, Washington.
- Chile. Comisión de Planificación de Inversiones en Infraestructura de Transporte. Secretaría Ejecutiva-SECTRA 1995. Plan de Desarrollo del Sistema de Transporte Urbano de Santiago, SECTRA, Santiago.
- Chile. Comisión Nacional del Medio Ambiente-CONAMA 1996. Plan de Descontaminación, CONAMA, Santiago.
- Chile. Ministerio de Vivienda y Urbanismo-MINVU 1994. Memoria Explicativa del Plan Regulador de Santiago, MINVU, Santiago.
- Collie, C. 1999. Bus drivers sign, but 60 have already quit. *New Zealand Herald* [online edition: <http://www.nzherald.co.nz/nzherald99...StoryID=102173>] 19 November.
- Daniels, C. 1999. Transport plans win widespread council backing *New Zealand Herald* [online edition: <http://www.nzherald.co.nz/nzherald99...StoryID=8031>] 2 June.
- Ducci, M.E., 1998. Santiago: Una Mancha de Aceite Sin Fin: Qué Pasa con la Población Cuando la Ciudad Crece Indiscriminadamente? *Revista Latinoamericana de Estudios Urbano Regionales* 24 (71), 85–94.
- Gleeson, B., 1994. Reforming Planning Legislation: A New Zealand Perspective. *Urban Policy and Research* 12 (2), 82–90.
- Kerr, R. 1996. Improving Transport Sector Performance. Keynote Address to the Chartered Institute of Transport Annual Conference, Wellington, New Zealand, November.
- Labour Party 1999. Labour on Transport: Transport strategy for New Zealand [http://www.labour.org.nz/InforCentre1/Policies/Transport-pol.html].
- May, P., 1993. Mandate Design and Implementation: Enhancing Implementation Efforts and Shaping Regulatory Styles. *Journal of Policy Analysis and Management* 12 (2), 634–663.
- McDermott, P., Toleman, R., Lee, R.W., 1997. Recent—and Future—Transport Policy Planning in New Zealand. *Transportation Research Record* 1606, 9–16.
- McSherry, M. 1999. Auckland has cocktail mix for traffic system success. *New Zealand Herald* [online edition: <http://www.nzherald.co.nz/nzherald99> Story ID = 3984] March 16.
- Mein, B., 1995. Competition—Is it working? *The Transportant* 25 (4), 12–14.
- Mein, B., 2000. Personal Communication. August, 24.
- Metropolitan Transit Authority 1997. Congestion Management Program for Los Angeles County, November. Los Angeles.
- Metropolitan Transportation Commission 1995. San Francisco Bay Area Congestion Management System: 1995 Annual Report, Oakland, USA.
- Inquiry into the Environmental Effects of Road Transport: Interim Report of the Transport and Environment Committee, Wellington, September.
- New Zealand Ministry of Transport 1996. Environmental Externalities, Discussion Paper, Land Transport Pricing Study, Wellington, New Zealand.
- New Zealand Ministry of Transport 1997. The Way Forward. Report of the Roading Advisory Group, Wellington, December.
- Newman, P., Kenworthy, J., Laube, F. and Barter, P. 1998. Indicators of Transport Efficiency in 37 Global Cities. A report to the World Bank. ISBN 86905 557 7.
- Parrochia, J., 1980. Santiago en el Tercer Cuarto del Siglo Veinte. Ed. Antartida, Santiago.
- Pierce, N., 1993. Citistates: How America Can Prosper in a Competitive World. Seven Locks Press, Santa Ana, CA, USA.
- Rivasplata, C., 1996. The Plan Regulador Metropolitano de Santiago: an integrated approach to urban transport planning? In: Baldasano, J., Sucharov, L. (Eds.). *Urban Transport and the Environment II*. Computational Mechanics Publications, Southampton, UK.
- Rutherford, R. and Freke, C. 1993. Public Transport Planning and Territorial Local Authorities Proceedings of the New Zealand Planning Institute Conference.
- Sabatini, F., Soler, F., 1995. Paradoja de la Planificación Urbana en Chile. *Revista Latinoamericana de Estudios Urbano Regionales* 21 (62), 63–64.
- Statistics New Zealand 1995. Facts New Zealand, Wellington.
- Taylor, B.D., 1995. Public Perceptions. Fiscal Realities and Freeway Planning: The California Case, *Journal of the American Planning Association* 61 (1), 43–56.
- Transfund New Zealand 1997. Project Evaluation Manual. Wellington. May.
- Transfund New Zealand 1998. Annual Report 97/98. Wellington.
- United States Department of Transportation. 1994. National Personal Transportation Survey: Urban Travel Patterns, Washington.
- United States. Department of Transportation 1998. Transportation Efficiency Act for the 21st Century (TEA-21), Washington.
- Wachs, M., 1993. Learning from Los Angeles: Transport Urban Form and Air Quality. *Transport* 20, 341.
- Watson, D. and Brennan T.W. 1996. Community Empowerment is the Next Transport Reform in New Zealand. Conference Proceedings, Australian Transport Research Forum, Auckland, New Zealand, Session 2a Paper 3, August.
- Wellington Regional Council 1995. Wellington Regional Land Transport Strategy.
- Wellington Regional Council 1996. Information on opinion survey results supplied at public workshop, April and November 1996.
- Zegras, C., Litman, T., 1997. Cost Estimates of Passenger Transport Air Pollution in Santiago. Chile, *Transportation Research Record*, 1587.