Integrating Social Equity into Urban Transportation Planning: A Critical Evaluation of Equity Objectives and Measures in Transportation Plans in North America

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Abstract:

Urban transport policies are characterized by a wide range of impacts, and trade-offs and conflicts among these impacts. The task of integrating and reconciling these impacts poses challenges, because they are incommensurable, and they affect different groups differentially. Further, impacts such as those related to social equity are hard to define and measure. In this paper we address two inter-related questions: How is social equity conceptualized, operationalized, and prioritized relative to environmental and other objectives; and how might social equity be more effectively integrated in urban transportation plans in North America? We critically analyze how social equity is incorporated into transportation plans in 18 large North American metropolitan areas, in terms of the quality of the related objectives, how meaningfully their achievement is assessed through the choice of performance measures or indicators, and their prioritization relative to other objectives. We observe that social equity goals and objectives are in many cases not translated into clearly specified objectives, and appropriate measures for assessing their achievement in a meaningful, disaggregated manner are often lacking. At the same time, there are good examples of social equity objectives and measures in several plans. In general, there is a stronger focus on the local environment (and congestion reduction) than on social equity in the plans. We end the paper with a discussion related to considerations for generating objectives and measures for better integrating social equity into urban transportation plans.

Keywords: urban transport, sustainability, equity, multiple objectives, performance measures.

1.0 INTRODUCTION

Throughout most of the 20th century, transportation planning goals were almost entirely *mobility*-based, with a focus on congestion reduction and time savings for motorists, and safety. As the century progressed, social and environmental movements fundamentally affected how governments, agencies and the public perceived the role of transportation systems, thereby influencing urban transport policy. Energy crises and increased environmental awareness in the 1970s led to the focus on other transportation system impacts, including urban air pollution and fuel use, and community disruption. More recently, in response to concerns regarding climate change, and given the major share of transport in greenhouse gas (GHG) emissions (US EPA, 2013), their reduction, through the use of public transit and alternative transport fuels, has become an increasingly important consideration, even playing a major role in how transit agencies advertise themselves -- see, for example, advertising campaigns in Montreal (STM, 2013).

Most current transportation plans explicitly present their vision within the context of "sustainability". However, two issues arise in this regard. First, what exactly is meant by sustainability? And, second, what meaningful approach can be adopted to adequately operationalize this elusive concept? Most conceptions of sustainability focus on some version of what is often called the "3Es" (Environment, Economic, and Equity).[1] While rarely made explicit in planning documents themselves, the challenge of delicately balancing these often competing values has long been addressed in the plan evaluation and sustainable transportation literature (Andrews, 1997; Baer, 1997; Berke and Conroy, 2000; Black, Paez, and Suthanaya, 2002; Boschman and Kwan, 2008; Garnett and Taylor, 1999). Campbell (1996) and Walker (2008),

[1] While this "triple bottom line" thinking has become intrinsically linked to most conceptions of sustainability, some have criticized the inclusion of economic considerations into the definition at all. Brugman (2007) argues that what was originally almost entirely a framework of social and environmental concerns was "blended" into "a less rigorous concept of economic growth" (p. 59). While his argument is somewhat out of the scope of the current research, it does set an interesting tone to the rest of this analysis. Footnote 3 shows an opposing viewpoint.

among others, discuss how environmental, economic and social equity goals compete for attention from policy makers, in transportation planning decision-making. Litman (2007) decries narrow notions of sustainability that overlook interconnections among, and suggests useful approaches for reconciling, various economic, environmental, and social goals. Lehtonen (2004) makes the case that it is within the "environmental-social interface" that key decisions must be made in order to achieve any true sense of sustainability. In addition, he highlights assumptions inherent in the various paradigms of sustainability, as well as their strengths and weaknesses, and the conflicts between the paradigms. Most importantly, he highlights the fact that the choice of one paradigm as opposed to another will affect decision-making.[2]

Transportation outcomes include those that are "tangible", such as reduced congestion and GHG emissions, improved air quality and safety, increased coverage and use of public transit, and increased cycling and walking. There are also less tangible outcomes related to issues of social equity or exclusion, as well as concepts such as walkability or livability. The former outcomes are easier to measure and to present to the public, and often have more political cachet than those focused on social equity. This can be problematic as more easily quantified goals can be – and are -- prioritized at the expense of the "intangible" objectives (Handy, 2008). Indeed, as Dale and Newman (2009, p. 670) point out, compared to ecological and economic indicators, social sustainability indicators remain "frustratingly abstract", to the extent that they exist at all. In this regard, note that The American Public Transit Association (APTA) assert, in their eight-page "Sustainability Commitment" (APTA, 2013), that "sustainability, preserving the environment, being socially responsible and maintaining economic viability, with an overall

[2] This could even be as a result of visual cues, i.e. are environmental, economic and social values presented as "pillars" or points on a triangle, or instead as overlapping—or concentric—circles? These distinctions could lead to important differences in how these values are conceptualized, balanced, and integrated. See also, for example, the work of Campbell (1996), Agyeman and Evans (2003), Feitelson (2002) and Baer (1997).

contribution to quality of life, is integral to what we do", and encourage their members to commit to "continuous improvement on environmental, social and economic sustainability". However, all eight of the performance indicators they list relate to environmental and resource use and waste minimization objectives; not even one relates to social equity. Further, of the approximately 40 "sustainable practices" listed, only one, calling for expanding programs for "populations with few transportation options, such as free passes for low-income school kids", relates to social equity.

Transportation policies narrowly focused on mitigating energy use, air pollution and climate change, by way of, for example, fuel-efficient vehicles or alternative fuels, are likely to do little to alleviate social inequities, such as those related to poor accessibility for pedestrians and cyclists. These policies might even exacerbate such impacts, as in the case of highway infrastructure development to achieve these ends by increasing motor vehicle speeds and smoothen their flows. Even policies to increase (less polluting) transit ridership might have social equity implications. Krumholz and Forester (1990) highlighted such conflicts , by using examples of transit planning in Cleveland from the 1970s. More recently, Walker (2008) has drawn attention to the conflicting objectives that transit operators may face, in providing service that attracts new riders, versus striving to better serve current users. Both environmental and economic goals tend to focus on attracting new riders, as replacing car trips has more emission-reducing and revenue-generating potential than improving service for current users. This dichotomy can manifest itself in many North American regions as municipalities prioritize suburban rail systems over improved inner-city bus lines (Bae and Mayeres, 2005). Suburban rail has the potential to reduce air pollutant and GHG emissions if it succeeds in causing a mode shift. However, the benefit to an inner-city resident with low accessibility to employment and other desired destinations due to poor or unreliable public transit is minimal – apart from

universal gains in air quality enjoyed by all. Many market-driven solutions to limit car use (congestion pricing and parking policy, for example), arguably have disproportionate effects on low income groups, who will either be "priced out" of their preferred mode more quickly or will pay a larger share of money to use the same service. Likewise, in active transportation, not distinguishing between people who walk or cycle because their neighbourhood is amenable to such activity and those who do simply because they lack access to a vehicle or other means of mobility might miss key issues of social equity. In addition, understanding who pays for and who benefits from transportation systems is equally important.

Astoundingly, recent work has challenged the inclusion of equity indicators in discussions of sustainability (Black, 2010).[3] However, it is surely not unreasonable to measure and understand whether (and which) groups suffer more—or benefit more—as a result of transportation infrastructure decisions. Indeed, as Solow (1991) argues eloquently and persuasively in relation to sustainability, a focus on inter-generational equity often masks current inequities, be it local, regional, or international. The many trade-offs that exist among multiple policy impacts for multiple groups must be clearly understood by planners, transparently integrated into the planning process, and clearly communicated to decision makers and the public they serve.

2.0 RESEARCH FRAMEWORK AND METHODOLOGY

Our ultimate purpose in this paper is to explore how social equity considerations might more effectively be incorporated and operationalized in urban transportation planning. To this end, we first of all use a set of transportation plans in large metropolitan areas in the USA and Canada –

[3] A full critique of this viewpoint is not within the scope of this work, but suffice it to say that intentionally ignoring issues of who benefits and suffers from transportation projects in the name of sustainability appears to be almost indefensible, apart from misconstruing sustainability.

which articulate long-range goals, objectives, and methods of defining and measuring progress toward them -- to analyze how social equity has been considered relative to other concerns in urban transportation planning; critically assess the quality of the social equity objectives and related performance measures in the various plans; and on this basis, as well as by drawing on the literature related to multi-criteria decision-making (MCDM), which has been used in many policy contexts to clarify and structure multiple policy objectives and develop related performance measures (Keeney, 1988 and 1992; Keeney and McDaniels, 1992 and 1999), to discuss considerations for generating objectives and measures for more effectively incorporating and operationalizing social equity into urban transportation plans. Following are the research questions we address:

- How is social equity conceptualized, operationalized, and prioritized relative to environmental and other objectives in urban transportation plans in North America?
- How appropriate and meaningful are the objectives and performance measures or indicators that are used to evaluate progress toward social equity objectives in these plans?
- How might social equity objectives be better operationalized in urban transportation plans?

To address our research questions we examined long-range transportation plans and related documents from 18 large cities—five in Canada and 13 in the U.S (See Table 1).[4] All of the cities or regions we selected have a population over 500,000 with recent (post-2005) and complete transportation plans available from an official government website. Three areas were of

[4] While the focus of this work was on plans from the most populous cities in North America, most with extensive public transportation systems, much could also be gained from examining small and mid-sized cities.

the most interest in our analysis; these are, in increasing order of importance: broad "mission statements" or other opening remarks that set the tone for the documents; plan goals and objectives; and performance measures used to gauge achievement and progress towards these goals and objectives. Including the plans, appendices, and other supporting documents, roughly 4000 pages of text were analyzed. Initially, a basic 'keyword in context' content analysis approach was adopted to quickly assess the importance accorded to social equity relative to other goals in the plans. This assessment[5] was followed by an analysis of whether and how multiple aspects of social equity are incorporated into transportation planning, of the quality of the related objectives, and of how meaningfully these objectives are measured through the choice of related performance measures or indicators. In presenting this analysis, we also discuss the pros and cons of specific objectives and performance measures or indicators, to inform how social equity considerations might more effectively be incorporated and operationalized in urban transportation planning. Our analysis will refer to Table 1, in which we list the social equity related goals and objectives indicated in the various plans, along with the related performance measures, as well as provide brief commentary on their quality.

We now discuss a few important caveats related to our selection of plans, and our methodological approach. While our sample of plans include those from cities, metropolitan areas and regions from across North America, and while we discuss specific social equity related objectives and performance measures in particular plans, it is important to note that our objective

[5] In this type of content analysis, word choice is often an issue. For example, while Calgary speaks of "affordable and universal access for all", Atlanta mentions "accessibility for all people". For this and other reasons, this method was only used it to gain a quick overall view of the plans. Each and every instance of a word was carefully considered to ensure proper counting. While related words (equity, equitable, inequity etc.) were counted, the use of 'equity' in a financial context, for example, was not. Other uncounted examples include "the built *environment*", "progress towards this goal has been *fair* to good". The intent was to quickly gain an overview of plans from a social equity perspective, and to analyze, if for example "fair and just outcomes" was mentioned several times in a given plan, whether meaningful performance measures related to these goals were provided.

is not to compare plans, one against the other, nor is it to compare city versus metropolitan versus regional plans, with respect to how well they incorporate social equity concerns and the quality of the related social equity objectives and indicators. For these reasons, we did not aim for our sample to be strictly representative of city, metropolitan and regional transport plans, separately or taken together; nor was it our aim to assess, for example, which specific social equity related objectives and measures were included in how many and which plans. Along the same lines, the differences in the policy context, and in the requirements, if any, regarding incorporation of social equity considerations, between city versus metropolitan and regional transport plans, and between US and Canadian plans, would be important to consider, if we were in fact comparing, and seeking to explain differences among these plans in terms of social equity. But as we have made very clear, that is by no means our purpose; rather, it is to use these plans to analyze, in general terms, how social equity has been considered relative to other concerns in urban transportation planning; and to critically discuss the pros and cons of specific social equity objectives and related performance measures drawn from the various plans.

Nevertheless, it is important to provide a brief discussion of the policy contexts underlying the long-range transportation plans in the various cities, metropolitan areas and regions that we have considered. Of the 18 plans, six are city-level plans, and ten are regional or “metropolitan” ones. The Metrolinx and Translink plans were produced by an agency of the Government of Ontario, and the regional transportation authority in Vancouver, respectively. Many of the metropolitan and regional-level plans cover a large territory; for example, the Metropolitan Transportation Commission of San Francisco plan covers a nine-county, 101 city region. Therefore the plans were written under different requirements and constraints. Plans prepared by Metropolitan Planning Organizations (MPOs), such as that for the SF Bay Area, are quite extensive and are subject to planning requirements under SAFETEA-LU. Further, metropolitan

and regional plans in the USA are required by federal policy to encompass issues of environmental justice and public participation (for example Title VI of the Civil Rights Act of 1964, President Bill Clinton's Executive Order 12898 of 1994, and subsequent USDOT guidance on environmental justice released in 1997, and updated in 2012). These requirements do not apply to city plans in the USA, nor of course to the Canadian plans. In relation to SAFETEA-LU, it is also worth noting the recent passage of MAP-21, which contains new planning requirements related to performance, but do not include equity factors. However, MPOs are now incorporating more social equity performance measures into their plans in response to the new guidance issued by USDOT on environmental justice and equity planning considerations in 2012. In any event, these differences in policy context do not change the underlying concern of this research, as already noted.

While we have taken great pains to unearth equity-related objectives and measures in the plans we selected for our study, we should once again stress that it would have been necessary for us to be absolutely exhaustive in doing so if in fact our purpose was to compare plans one against the other. Our purpose is not that. Finally, the current research is not focused on whether and to what extent the cities, metropolitan areas and regions that we have considered actually achieve their stated objectives, nor is its purpose to assess their actual social equity outcomes. Plans, being guides to action, and a means of monitoring progress, are our concern here; and to the extent that social equity is in fact considered, and related objectives and performance measures are indicated in them, our aim is to assess their quality. Of course, actual outcomes are important, and they might well be positive, regardless of plans – and indeed, just because social equity may not be explicitly mentioned in the plans, or specific objectives and measures related to social equity are not indicated in them, or even if these objectives and measures are not in

some way appropriate or meaningful, it should not be taken to mean that social equity is not considered in policy-making, nor that social equity outcomes are necessarily poor.

The remainder of this paper is structured as follows: in the next section, we present our analysis of how social equity has been considered relative to other concerns in urban transportation planning, and the quality of the related objectives and performance measures in the various plans. Based on this analysis, and by drawing on the MCDM literature, we then discuss some considerations for generating objectives and measures for more effectively incorporating and operationalizing social equity into urban transportation plans.

3.0 SOCIAL EQUITY GOALS, OBJECTIVES AND PERFORMANCE MEASURES – A CRITICAL EVALUATION

The key word in context analysis indicated that environmental sustainability is a focus in many of the plans that we analyzed. As well, social equity issues are acknowledged as being important, and related goals and objectives are articulated in nearly all the plans; as Agyeman and Evans (2003) note, there has been significant progress since the early 2000's in this regard. Indeed, a particularly strong case is made for considering justice and fairness in transportation policy in some plans; a powerfully eloquent statement to this effect is made in the Chicago plan, for example.[6] In general, however, there is an overwhelmingly stronger focus on environmental rather than social justice goals in most plans. While this discrepancy is more pronounced in some plans than in others, overall, environmental sustainability (or related concepts) are mentioned more than five times as are equity, fairness, or justice. While we do not intend to set up a dichotomy between

[6] The statement reads: "Environmental justice addresses questions of distributive fairness in public decisions. Transportation decisions, inasmuch as they affect allocation of public goods, often raise questions relating to the "equity" of their benefits and the burdens or "externalities" they may produce. The variability in burdens and benefits resulting from transportation decisions are often obvious, but their full impact is difficult to account for completely." (Chicago Metropolitan Agency for Planning, 2008, p. 13).

environmental and social justice objectives, this fact is worthy of note, especially because, as we argued in the Introduction, trade-offs between these two sets of objectives are in fact possible.

Table 1 – Social Equity-related Objectives and Measures in Sample North American Transportation Plans

Plan	Goal/Objective	Measure	Comments
Atlanta Regional Commission, 2011	**Goal**: Improve accessibility and mobility for all people and freight. **Objective:** Improve connectivity between low income and minority populations to major employment and activity centers Increase the security of the transportation system for motorized and non-motorized users. Reduce [safety] incidents on all modes (p. 36)	Environmental Target Area (ETA) communities identified based on the share of the population of seniors, people without high school education, low median housing values, high household poverty rates, and high share of minorities. Other EJ measures: population share with limited English proficiency, and disabled people. Transport impacts are assessed for ETA versus non-ETA areas, in terms of zero car households, accessibility (by walk, transit and car) to employment centres, transport projects and investments, jobs-housing ratios, and Livable Centers Initiative projects. (Appendix C-3) – "Mobility" measured in terms of average commute travel time by auto and transit; "Connections/accessibility" in terms of worker access to employment centres within 45 minutes by car and transit, and average number of jobs within 45 minutes of home for a typical person. (Appendix C-2).	Objectives and measures focus on a range of impacts (accessibility, mobility, safety, travel time, jobs-housing balance), which are important from the point of view of equity, for geographic areas with high percentage of a range of disadvantaged groups, and for different modes; accessibility to jobs and other activities is stressed; however zero-car households should be a parameter for identifying ETA communities, not really a transport impact. Multi-modal accessibility and jobs-housing ratios are important outcomes from the point of view of equity, but appear to constitute "double-counting". Transport projects and total transport investments by project type and Livable Centers Initiative (LCI) Projects in ETA communities are important but are means rather than outcomes. Finally, the measure related to number of jobs within 45 minutes for a "typical person" is vague, and doesn't really address equity effects.

Plan	Goal/Objective	Measure	Comments
City of Baltimore, 2007	**Objective:** Provide system accessibility and increase transportation alternatives for all segments of the population. (p. 16) Accessible, balanced, integrated regional transportation network (p. 16)	Mobility for special needs populations – young, elderly, poor, disabled, unemployed. Reflects consensus opinion of key (local) interest groups and private sector. (Appendix 5, p. 51)	Although the objective refers to accessibility, the measure focuses on mobility for special needs populations; besides, this reference to special needs populations is under "Prioritization Methodology" in Appendix 5 and therefore serves a slightly different role than performance measures; nevertheless, it is good that the various special needs groups are specified. The call to reflect consensus of various interest groups, as well as for a "balanced, integrated" regional network, is vague.
Boston Region Metropolitan Planning Organization 2009	**Goal**: Regional Equity (p. 4-5) Objective: Provide better access for all, including youth, elderly and disabled users, and members of zero-vehicle households. (p. 4-3) Assess regional equity (p. 4-5)	Accessibility to needed services and jobs, Mobility and congestion, Stratified by EJ and non EJ zones or areas (p. 14-3) Assess regional equity by analyzing mobility, accessibility, and congestion for communities with a high proportion of low-income and minority residents. (p. 4-5)	Objectives and measures focus on a range of impacts relevant to equity -- accessibility, mobility, travel time, for geographic areas with high percentage of disadvantaged groups (EJ zones) as opposed to non-EJ zones; the accessibility measure takes into account jobs as well as other essential services; finally, the focus on regional equity is good.
City of Calgary, 2009	**Goal**: Promote safety for all transportation system users. Provide affordable mobility and universal access for all. (pages 1-6) **Objective**: A range of affordable, accessible, fixed-route and specialized door-to-door transit services should be provided to address the mobility needs of persons with disabilities and low income Calgarians who depend on public transit for their mobility (p. 3-15)	None	While the goals are worthy, the objective focuses on a limited set of means, rather than outcomes of concern, for a limited set of groups; more importantly, there are no measures for assessing impacts or progress.

Plan	Goal/Objective	Measure	Comments
Chicago Metropolitan Agency for Planning, 2008	**Objectives:** Support links from disadvantaged communities to jobs and services. Provide travel benefits to persons of all ages, abilities, incomes, races and/or ethnicity. Avoid placing disproportionate burdens on minority or low-income populations. Reduce dependence on personal transportation assets. Provide improved transportation choices to economically disadvantaged persons. Stimulate balanced and sustainable development in communities with concentrations of disadvantaged residents. Support programs providing financial incentives to low-income persons residing in communities that provide a wider variety of transportation choices. Balances project burdens among all who benefit. Minimizes or mitigates project burdens on disadvantaged populations. (p. 28)	"Areas with concentration of minority population more than twice the regional mean" and "Areas with average median income less than ½ the regional mean" have different/higher stated targets in terms of work time commute and access to jobs. (p. 59)	Clear articulation of objectives related to multiple dimensions of equity, for various disadvantaged groups; impacts to be minimized or enhanced, and the groups and areas for which these objectives are to be achieved, are clearly specified; reduced dependence on personal transport, a wide range of transport choices in low-income areas, accessibility to jobs as well as services, equitably distributing project benefits and costs, and minimizing project burdens on disadvantaged populations, are stressed; and importantly, targets are specified for disadvantaged areas in terms of commuting time and access to jobs.
City of Houston, 2007	None	None	
City of Montréal, 2008	**Vision Statement**: Meeting the transportation needs of all Montréal residents by providing our community with a high quality of life and ensuring its role as a prosperous and environmentally friendly economic powerhouse (p. 34)	“A gradual review should be conducted of the transportation system and its related structures to see how they measure up in terms of universal access principles, particularly in terms of travel by foot or by public transit" (p. 40)	A worthy vision statement, as is the mandate to review how the transportation system “measures up” in terms of pedestrian and transit accessibility, but the reference to “universal access principles” is vague, and there is no clear specification of the measures in terms of which achievement of these objectives are to be assessed.
City of Minneapolis 2009	None	None	

Plan	Goal/Objective	Measure	Comments
New Orleans Regional Planning Commission, 2010	**Objective:** Ensure that the transportation system equitably serves all members of the community (p. 20)	"Projects implemented and dollars invested in traditionally disadvantaged or underserved populations." (p. 21) Percentage of population that has access to employment centers via different modes (p. 29)	A worthy objective focusing on equity, but the first measure focuses on means (projects and dollar investments) rather than on outcomes, and does not clearly define disadvantaged populations; the second measure assesses access to employment by various modes, but not how members of various groups are differentially affected in this regard.
New York Metropolitan Transport-ation Council, 2010	None	None	
City of Ottawa, 2008	**Goal:** Provide adequate and equitable funding. (p. 22) Reduce unwanted social and environmental effects (p. 86)	Reduce air emissions, road salt use, and road surface per person) (p. 86)	While the goal calls vaguely for "unwanted" social and environmental effects to be reduced, there are no measures related to social effects; but even the environmental measures refer to means, not outcomes; so does the goal to provide adequate and equitable funding, besides being vague.
San Antonio-Bexar County Metro-politan Planning Organization 2009	**Goal:** Enhance the effectiveness of the regional transportation system by addressing the social, economic, energy and environmental issues of the region in all transportation planning efforts. Increasing accessibility for the traditionally under-served segments of the community. (p. 1-5)	None	An inclusive, though vague goal, but no measures in terms of which to assess "effectiveness" in terms of the various issues listed, nor accessibility; further, the "under-served segments" for which accessibility is to be increased are not specified.
San Diego -- SANDAG, 2007	**Goal**: Provide equitable levels of transportation services for low-income, minority, and elderly and disabled persons (p. 2-2)	Stratified goals ("non-minority" - "minority", "non-low-income" - "low-income") in "average travel time", "work/school/non-work trips within 30 minutes", "homes within half mile of a transit stop" (p. 2-8)	The objective and related measures clearly specify the various disadvantaged groups for which equity is to be achieved; besides, the measures clearly specify a range of impacts related to various dimensions of equity, to be assessed for various groups; however, proximity to transit stops, though useful, is not an adequate measure of transit accessibility.

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Plan	Goal/Objective	Measure	Comments
City of St. Louis, 2010	**Goal**: Addressing the complex mobility needs of persons living in low-income communities, the elderly, and persons with disabilities. (p. 19)	None	Worthy goal, albeit vague in its reference to "complex mobility needs", and various disadvantaged target groups are specified, but there are no measures in terms of which impacts are to be assessed.
San Francisco – Metro-politan Transport-ation Commission, (MTC), 2005	**Objectives:** Equitable Access, livable communities, Improve affordability (p. 13)	Access to low-income jobs, access to non-work activities (such as shopping, school and recreational trips), and affordability by 10 percent the combined share of low-income and lower-middle-income residents' household income consumed by transportation and housing (p. 26)	The measures clearly specify a range of impacts related to various dimensions of equity; besides, measures are focused on transport affordability, in addition to accessibility, for low-income groups, with the affordability measure being very clearly defined; also noteworthy is the specification of access to low-income jobs, as opposed to all employment, and to non-work activities; finally, a target specified for affordability.
Seattle Department of Transport-ation, 2005	None	None	
Toronto – Metrolinx, 2008	**Goal**: People will have a wide range of options available to them for getting around regardless of age, means or ability, including walking, cycling, public transit and automobiles. (p. 15) **Objective:** Improved accessibility for seniors, children and individuals with special needs and at all income levels (p. 15)	None	Worthy goal and objective, with a range of modes and disadvantaged target groups specified; however, "a wide range of options" for "getting around" is rather vague, and besides, there are no measures in terms of which impacts are to be assessed.
Vancouver – Translink, 2008	**Goal**: Travelling in the region is safe, secure, and accessible for everyone (p. 27)	None	Worthy goal, but there are no measures for impact assessment.

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As implied in the statement in the Chicago plan highlighted in Footnote 6, it is desirable, in order to gain a nuanced understanding of the social equity impacts of urban transport systems, and the policies and plans that underlie them, to assess, in a disaggregated fashion, how different groups in society, stratified based on, for example, income, age, gender, minority status, mode(s) used, location, and so on, are differentially affected by transport impacts. An examination of Table 1, in which we provide brief critical commentary on the social equity related goals, objectives and measures indicated in the various plans shows that, while goals and objectives related to differential impacts for various groups and modes, in terms of accessibility, mobility, travel time, safety, transportation expenditure and affordability, and transportation investments, all of which have a bearing on equity, are indicated in the plans, taken as a whole, these differential impacts are addressed in a somewhat comprehensive manner only in a few plans. On the other hand, and as importantly, social equity goals are in many cases not translated into clearly specified objectives; and even in cases where there are such objectives, measures for assessing achievement of the objectives, meaningfully and in a disaggregated manner, as discussed above, are often lacking. Finally, while equity seems not to be an important focus in some plans on first reading, we find – echoing work by Berke and Conroy (2000) – that well-developed objectives and performance measures related to this issue are in fact featured in these plans. We discuss examples of these different situations below.

A wide range of objectives related to multiple dimensions of social equity are included in Metro Chicago's plan; these objectives clearly indicate a range of policy impacts to be minimized (or enhanced, as the case may be), for various individuals, groups, and communities, disaggregated by age, ability, income, race, ethnicity and social disadvantage. In particular, note that a wide range of transportation choices and accessibility to jobs as well as to services in low-income areas, and

the need to equitably distribute project benefits and costs and minimize project burdens on disadvantaged populations, is stressed. As well, there are clearly specified measures incorporating targets in terms of accessibility to jobs and journey to work commute time for clearly defined areas with high proportions of low income and minority populations.

Objectives and measures focusing on a range of impacts relevant to various dimensions of equity, to be assessed for various disadvantaged groups, or for geographic areas or communities with high percentages of disadvantaged groups, are also featured in the Boston, San Diego and San Francisco plans. The accessibility measure accounting for jobs as well as other essential services, and the focus on regional equity, are worthy of note in the Boston plan. The specification of disadvantaged groups – in terms of income, minority status, age and disability -- for which equity impacts are to be considered is perhaps as expansive in San Diego's as in Chicago's plan; further, accessibility for different work and non-work trip purposes is considered. However, note that the "homes within half mile of a transit stop" measure in San Diego's plan is not really an adequate measure of transit accessibility, as we discuss in the next section. Apart from the focus on accessibility to non-work activities in addition to work (as in the Boston and San Diego plans), what is noteworthy in San Francisco's plan is the specification of access to low-income jobs, as opposed to all employment, and in particular, the clearly specified measure, in terms of the share of household income spent on transportation and housing, to assess transport affordability for low-income groups, with a target also specified in this regard.

Careful attention to social equity is paid, although this appears not to be the case on first reading, in some plans, as noted earlier. This is in part due to the fact that how this is done might be detailed in appendices, as in the case of the Atlanta plan, in which objectives and measures focus on a range of impacts for various modes and disadvantaged groups, and for geographic areas

with a high share of these groups. A methodology for identifying Environmental Target Areas (ETAs) based on the share of the population of seniors, people without high school education and minorities, besides low median housing values, and high household poverty rates, is clearly laid out in Appendix C-3; other measures such as population share with limited English proficiency and disabilities, are also considered. Transport impacts are assessed in terms of accessibility to employment centres, commuting time, transport projects and investments, and jobs-housing ratios, among others, for various modes and/or for ETA versus non-ETA areas (Appendices C-2 and C-3). Note also that accessibility to jobs and other activities for disadvantaged groups is stressed, as in the Chicago, Boston and San Diego plans. However, while accessibility and jobs-housing ratios are both important outcomes for equity, considering both in evaluating alternatives could constitute "double-counting", since the latter is a means to achieve the former. Also, transport projects and investments in ETA communities are important but are means rather than outcomes of concern. Similarly, the seeming lack of adequate attention to social justice and equity in the New Orleans 2040 Transportation Plan was at first surprising, especially given the concerns raised over race and income disparities in the response to the Katrina disaster. However, closer examination revealed that social equity considerations are in fact subsumed within goals and objectives related to other issues. For example, the objectives, performance measures and strategies within Goal 4 (Economic Competitiveness) are some of the most appropriate and clearly specified objectives, for addressing social equity issues; additionally, clear guidelines for public participation are laid out in the plan. However, note that while the objective (in Table 1) focuses on equity, it is not clearly enough defined in terms of specific disadvantaged groups; besides, the first measure "Projects implemented and dollars invested in traditionally disadvantaged or underserved populations" focuses on means rather than on outcomes, which are what really count, and does not clearly define disadvantaged populations. The second measure "Percentage of population that has access to

employment centers via different modes" is better, but does not really address how members of various groups are differentially affected in this regard.

While the objectives in Baltimore's plan of providing "system accessibility and increas(ing) transportation alternatives for all segments of the population", and "accessible, balanced, integrated regional transportation network" are worthy, the related measures, although they clearly specify the special needs groups that need attention, focus on mobility, not accessibility. Further, it is not clear how the achievement of a "balanced, integrated" network is to be assessed; besides, while broad consultation is desirable, it is unclear how the call to reflect the consensus opinion of key local interest groups and the private sector is to be operationalized, or assessed. Meanwhile, whereas a general vision statement that commits to "meet the transportation needs of all Montreal residents" is included In Montreal's plan, and a gradual review is called for, of the extent to which "universal access principles" are being met, particularly for walking and transit, there is no clear specification of these principles, nor of measures in terms of which their achievement are to be assessed, in the plan. One of the goals in Ottawa's plan calls vaguely for "unwanted" social and environmental effects to be reduced, but there are no measures related to social effects; however, even the environmental measures refer to means, not outcomes. As for the goal to provide adequate and equitable funding, there is no measure specified for measuring its achievement.

Finally, while virtually no social justice goals nor related measures are indicated in the plans of Houston, Minneapolis, New York and Seattle, the social equity goals and objectives in the plans produced by Calgary, San Antonio, St. Louis, Toronto, and Vancouver, are to varying degrees not well specified, though worthy, and importantly, there are no related measures specified. The goals related to safety, affordable mobility and universal access for all in Calgary's plan are of course desirable, but the related objective focuses on a limited set of

specific approaches, for a limited set of groups; and while these approaches are of course also desirable, they are means rather than outcomes of concern (see Table 1). In San Antonio's case, the "traditionally under-served segments of the community" for which accessibility is to be increased are not specified; lastly, while various target disadvantaged groups and/or modes are specified in St. Louis's and Toronto's plans, the "complex mobility needs" that are to be addressed for them (in St. Louis's plan) and "a wide range of options" for "getting around", for various modes in Toronto's plan are vague. Notwithstanding these criticisms, it is worth reiterating our earlier caveat that social equity not being adequately addressed in plans does not mean that it is not considered in policy-making, nor that social equity outcomes are necessarily poor.

3.1 Weighting of Social Equity Relative to Other Objectives

While the relative importance of various goals and objectives is not explicitly addressed in most plans, one of the more transparent means for doing so is contained in Baltimore's plan (specific guidelines in this regard are also contained in San Francisco's plan). In a section entitled Prioritization Methodology (City of Baltimore, 2007 Appendix 5, section 3), seven broad sets of objectives (including those related to safety, environment, and accessibility) are listed along with related performance measures, each of which is weighted. While the objective "contributes to short and long term achievement of air quality targets" is assigned 8 points, "enhanc(ing) mobility for special needs populations – young, elderly, poor, disabled, unemployed" is accorded only 4 points. Meanwhile, "reduction of congestion" is worth 5 points, whereas "an accessible, balanced, integrated regional transportation network" qualifies for only 4 points. Finally, within the Environmental Quality section, "promoting efficient use of natural resources" and "Helps sustain/clean up the Chesapeake Bay" are worth 2 and 5 points respectively.

While the relative importance of a range of transportation policy goals is explicitly considered in Baltimore's plan, the foregoing shows that local issues outweigh global, and even regional concerns, and the much stronger focus on local environmental (and congestion reduction) rather than social equity goals. Of course, as we discussed previously, tradeoffs between these sets of objectives are by no means inevitable, although they are possible, and do occur. But perhaps most importantly, while the relative weighting of objectives is indicated, it is not clear how to assess, by way of appropriate measures or indicators, the extent to which policies perform on each objective, as noted earlier in relation to "accessible, balanced, integrated regional transportation network". Similarly, congestion and mobility are given particular importance in Atlanta's and Houston's plans. In Atlanta "Regional policy-makers identify congestion as the biggest issue impacting our region's quality of life" (Atlanta Regional Commision, 2007, p. 99); this prioritization is clearly reflected in the goals, objectives and performance measures throughout the plan. While social equity is in fact considered fairly well, in its multiple dimensions, in Atlanta's plan, as discussed earlier, the city puts considerable effort into reducing congestion, and highway and transit infrastructure projects are weighted 70% for their congestion reduction potential and 30% for their "environmental impact" in a document entitled "Prioritization of System Expansion Projects". This prioritization could create adverse social equity effects if indeed plans to "build-out" of its congestion problems are implemented.

4.0 TOWARD MORE EFFECTIVE INTEGRATION OF SOCIAL EQUITY IN URBAN TRANSPORTATION PLANS

Urban transport policies are characterized by a wide range of socio-economic, health and welfare, environmental, and resource use impacts for current and future generations. Different policy alternatives produce different kinds of trade-offs and conflicts among these impacts. As

well, policy impacts affect different groups differentially, and are unevenly distributed across them, as acknowledged by way of the specification of impacts to be considered for various disadvantaged groups, in several of the plans discussed in the previous section. The task of integrating and reconciling diverse impacts for different groups poses a daunting challenge, because they are incommensurable; also, impacts such as those related to social equity are intangible, hard to define, conceptualize, and measure. While recent work (Feitelson, 2002; Geurs, Boon and Van Wee, 2009; Stanley and Villa-Brodrick, 2009) examines the difficulties of considering issues such as social exclusion in evaluating transport policy, the task of integrating and reconciling such intangible impacts – which is a central challenge in policy analysis – has been well recognized since the late 1960s (see for example, Hill, 1968).

The multi-criteria decision making (MCDM) approach, which has been used in a number of policy contexts, is ideally suited for addressing complex decision problems characterized by multiple groups with multiple conflicting objectives, and that are differentially affected by policy impacts. Particular attention is paid in MCDM to clarifying and structuring policy objectives representing the perspectives of a diverse range of groups, and to carefully developing related measures by means of which to evaluate policy alternatives in terms of the objectives, and monitor progress toward them (Keeney, 1988 and 1992; Keeney and McDaniels, 1992 and 1999). MCDM enables, among other things, mutual appreciation of multiple perspectives among various interested and affected groups, and the reconciliation of trade-offs and conflicts, thereby enhancing the chances of long-term policy success. Crucially from the point of view of this paper, it enables the issue of equity to be addressed explicitly.

Measures are specified as precisely as possible, so that they capture the meaning of the related objectives, with a clear theoretical link with them; this of course is especially challenging for social impacts, as Meyer (2001) has pointed out. While intangible issues such as social equity

will remain so without good measures, any measure is not necessarily better than no measure at all. Further, note that different measures (or indicators) for the same objective reflect different perspectives, convey different pictures of a given situation, and importantly, have different implications for policy choices and outcomes -- as in the case of, for example, pedestrian fatalities per million vehicle-kilometres versus per million pedestrian trips, versus per million pedestrian-kilometres, versus per capita.

While measures should precisely capture the meaning of related objectives, they should at the same time be easily operationalizable, given available institutional resources. Also, the ability of measures or indicators to easily communicate desired policy objectives and outcomes to decision makers and the general public is vitally important. Indeed, objectives along with their related measures are, and need to be seen as, a powerful tool to convey what transportation agencies really stand for, what they consider to be priorities, and how achievement of these priorities will be monitored; as a practical matter then, objectives and measures should be easily accessible – as opposed to being presented in appendices -- and readily understandable. A more complex and data-intensive measure is to be preferred to a simple one only if the relative benefits of the former, in terms of capturing and conveying the meaning of an objective, justify its costs. Finally, structuring objectives and developing measures are an inter-dependent process; while clarifying objectives sharpens selection of measures, thinking about measures helps clarify objectives.

It is important that the objectives and indicators, taken together, capture the multiple dimensions of social equity, in terms of the various policy impacts that differentially affect various groups, such as accessibility, safety, traffic noise, and transportation expenditure and affordability. It is particularly important that the objectives selected not be merely means to outcomes of concern, but rather the outcomes themselves, in order to avoid double-counting in

performance evaluation, which would give more priority to certain outcomes than desired. Examples of situations to avoid are assessing both accessibility and jobs-housing balance, as in the Atlanta plan, since the latter is a means to achieving the former; and transport projects and investments as a measure, as in the Atlanta and New Orleans plans, because this measure would show strategies which involve large outlays as good, whereas it is entirely possible to achieve desired outcomes with low levels of investments. Further, impacts should ideally be measured in a disaggregated manner, for various disadvantaged individuals, groups, and communities, stratified by, for example, income, age, gender, race and ethnicity, disability, mode(s) used, and location; as well, it is important to consider the issue of regional equity. Of course, while such disaggregation is desirable for a nuanced understanding of, and to measure progress toward, social equity in urban transport, the benefits of doing so should be weighed against the associated costs, as discussed.

Let us consider, by way of example, the goal of improving the situation for pedestrians. One could use the total length of sidewalks (perhaps in comparison to the length of roads) as a measure; or perhaps one could assess, either through some objective means or through surveys, "walkability", in terms of the quality of the pedestrian environment. But if pedestrians have to walk great distances or spend inordinate amounts of time to get to their destinations, this measure would not be particularly useful; besides, the bulk of the high quality and "walkable" sidewalks might be concentrated in a few neighbourhoods. Or perhaps, as is common, one could use mode shares for pedestrian trips as a measure. While this measure might be indicative of a favourable situation for pedestrians, it could also simply be a reflection of a population that cannot afford to own cars or to use transit. Besides, even if walking mode shares were high, pedestrians might feel insecure, and there might be a high level of pedestrian injuries and fatalities. It is therefore a

challenge to fully capture the multiple dimensions of the situation for pedestrians, in urban transport policy and decision-making.

Similarly, in the case of public transit, one could use the fleet size, or the daily fleet-kilometres as measures of the quality of service; but these are merely a means to an end, not the end itself. One could, on the other hand, approach the problem from the vantage point of transit commuters, and measure proximity to bus stops (as in the San Diego plan, discussed in the previous section), and/or the frequency of service. But these measures say very little about the service, if buses do not go from where most people who wish to use them live, to where they wish to go. Transit mode shares, whether in terms of passenger trips, or passenger-kilometres, may be a better measure, but as in the case of walk shares, they might be reflective of a lack of other options, more than a choice on the part of car owners; besides, they say nothing about the availability, comfort and convenience of transit service across different regions and groups.

Accessibility, which is essentially the ease and convenience of reaching desired destinations, on the other hand, is a good measure of a desired outcome, because it combines in itself a measure of how well essential services are spatially distributed, and how well people are located relative to those services (namely urban form and land use), along with (in the case of public transit and pedestrian commuting, for example) the quality of transit service, the quality of the pedestrian environment, the effectiveness of traffic system management, the lack of physical barriers, and so on. Indeed, while accessibility measures can be tailored to capture multiple dimensions of transport system effectiveness, livability and equity at multiple scales, few transportation plans adequately conceptualize or measure this concept in planning documents.

Accessibility can be determined and compared for different modes over time, for example, in order to assess how various modes are being provided for and prioritized in urban transport policy and decision-making. Accessibility can also be assessed separately for different trip

purposes and destination types (work, education, shopping, health, recreation, etc.); for different groups (old, young, low income, ethnic minority, people with disabilities), and for different neighbourhoods and regions. Effective comparisons of accessibility in these terms can be made at the neighbourhood or census boundary level. Such a disaggregated assessment of accessibility might show, for example: that while on average journey times to work are improving over time for cars, they are becoming longer by transit (because of, among other factors, poor pedestrian accessibility, declining transit service, lack of priority for transit, etc.); above average journey times to retail for homemakers or the elderly, because of poor transit service during off-peak hours, when they typically travel; higher accessibility to schools and health facilities in high income relative to low income neighbourhoods, perhaps because of better provision of quality schools and health care, along with the fact that children are driven to school, in the former, and barriers due to highways in the latter; high pedestrian accessibility in high income neighbourhoods even though walk shares are low, and the reverse in poor neighbourhoods, and so on. Two good examples of carefully designed measures for accessibility in the plans we looked at are those for low-employment, but also other essential services, or non-work trips, for low-income groups, in the Boston, San Diego and San Francisco plans; a further refinement in this regard is the accessibility for low-income groups specifically to low-income jobs, rather than all employment, in the last plan.

Of course, while accessibility is a good measure of social equity in urban transport, there need to be others as well, since after all, as we discussed, social equity is a multi-dimensional issue. Some other measures to this end might include the difference between top and bottom income quintiles in percentage share of household expenditure devoted to transport (note that there is a well specified measure of transport affordability for low-income households in the San Francisco plan), and the difference between traffic fatalities and injuries per passenger trip for cars, non-

motorized modes, and public transit. Finally, it is worth noting that objectives and related measures should not merely serve the purpose of performance measurement, but clearly indicate a desired policy direction, and even better, clear performance targets, as in the case of the Chicago and San Francisco plans.

5.0 CONCLUSIONS AND RECOMENDATIONS

Throughout most of the 20th century, transportation planning goals were almost entirely mobility-based, but there has been significant progress since the early 2000's in acknowledging social equity issues as being important, and articulating social equity in addition to environmental and other goals and objectives. While goals and objectives related to various policy impacts that differentially affect different groups, and which therefore have a bearing on equity and justice, are present in the plans we examined, taken together, these differential impacts are addressed in a somewhat comprehensive manner only in a few plans. Further, social equity goals are in many cases not translated into clearly specified objectives; even in cases where there are such objectives, appropriate measures for assessing achievement of these objectives, meaningfully and in a disaggregated manner, are often lacking. On the other hand, there are several good examples of social equity related objectives and measures in several of the plans, as we highlighted in our discussion in Section 3. Further, while equity seems not to be an important focus in some plans on first reading, we find that well-developed objectives and performance measures related to this issue are in fact featured in these plans. Finally, local issues outweigh global, and even regional concerns, and there is a much stronger focus on local environmental (and congestion reduction) rather than social equity goals in the plans, overall, and in the few plans in which the relative weighting of various objectives is explicitly addressed.

Balancing diverse goals as well as integrating new values into the decision-making process is one of the transportation planner's most important tasks. By carefully considering issues of social equity, and embracing the value of social benefits that can be provided by transportation systems, planners can move towards making them more sustainable. This task of course presents major challenges in terms of policy analysis, as well as policy making and implementation, and both researchers and professionals will need to give careful thought to ways and means of surmounting them. In this regard, we welcome the incorporation of more social equity performance measures by MPOs, in response to USDOT's updated 2012 guidance on environmental justice and equity planning considerations.

Based on our analysis, we would reiterate the importance of clearly specifying objectives and measures that capture the multiple dimensions of social equity, in terms of the multiple policy impacts that differentially affect various disadvantaged individuals, groups, communities, and regions, along the lines we have discussed in our paper – doing so will go a long way to better understanding social equity impacts, and making progress toward achieving social equity goals in urban transport. As well, the important communicative and educational value of objectives and measures in transport plans must be recognized.

Some specific suggestions for comprehensive measures or indicators to capture social equity objectives for multiple groups over time are: changes in accessibility to desired (work and non-work) destinations, for various, but in particular, disadvantaged groups; the difference in journey times, for work trips and to access essential services, between car and public transit, and between top and bottom income quintiles; the difference between top and bottom income quintiles in the percentage share of household expenditure on transport; and the difference between car users and non-motorized users in traffic deaths and injuries, on a per trip basis. These indicators have the distinction of being relatively straight-forward to capture with a

combination of census data, regional travel surveys, and on-board surveys. A plan with these kinds of indicators could potentially go a long way toward making social equity a less "intangible" aspect of transportation planning. Recent work by the authors shows the usefulness – and feasibility—of disaggregated analyses of social equity issues along the above lines, at the regional scale, using data that most cities already collect (Manaugh and El-Geneidy 2012; Foth, Manaugh and El-Geneidy, 2013) . However, it is also important to point out that, while disaggregated measures, along the lines discussed above, are useful in characterizing, understanding and highlighting differences in outcomes for different groups in society, even disaggregated measures can still mask important variance in within group differences (Bills, Sall, & Walker, 2012).

Several important aspects were beyond the scope of the present research, but are recommended as future research directions. Examining in depth the actual approval processes for individual infrastructure projects, and the actual effects of these projects on different neighborhoods and groups would provide much needed insight into their fairness, in better understanding how equity issues are being prioritized, and how these issues can be more effectively integrated into transportation planning. Lastly, better understanding how federal, and state legislation influences, and can influence, local and regional transportation plans and their outcomes, would be useful.

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