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16. Abstract

The major objective of this report is the development of an inventory, or "primer," of innovative methods for the development, finance and implementation of sustainable developments. Through the use of case studies, the identification of specific methods, techniques, and policies, and scenario-building, this primer will provide direction for interested participants in the process of sustainability. This report includes a discussion of the complex and ambiguous concepts of "sustainability," "sustainable development," and "sustainable transportation" in order to develop a basic understanding and framework for the report. Many barriers exist which confront planners, decision makers, and advocates when attempting to move a community along the path to sustainability, including cultural and behavioral, professional norms, economic development practices, and traditional planning practices. This report also presents several case studies which illustrate how communities, regions, and countries are approaching the problems associated with unsustainable transportation practices. These cases are supplemented by inventories of solutions to these barriers which are derived from further examinations of the research on and application of sustainability at the local level. Four categories of solutions are outlined: policy solutions, legislative solutions, planning solutions, and financial solutions. The findings from this study are then aggregated into a framework for the development of a scenario for sustainable transportation. This scenario consists of a modification model for transforming the traditional comprehensive planning process into one which integrates sustainability and objectives of sustainable development. This scenario presents a cyclical process for sustainable development from finance through implementation. The final section of the report focuses on the difficulty in integrating sustainability, as a concept, and sustainable development into professional practices and paradigms.

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# FINANCING AND IMPLEMENTING SUSTAINABLE DEVELOPMENT: A LOCAL PLANNING APPROACH

by

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# ABSTRACT

There is a significant amount of research on the concepts of "sustainability" and "sustainable development," yet few studies focus on how to move communities toward sustainability, encourage developers to use the principles of sustainability in construction or how to get cities to integrate these principles into their regulatory framework. The major objective of this report is the development of an inventory, or "primer," of innovative methods for the development, finance and implementation of sustainable developments. Through the use of case studies, the identification of specific methods, techniques, and policies, and scenario-building, this primer will provide direction for interested participants in the process of sustainability. This report includes a discussion of the complex and ambiguous concepts of "sustainability," "sustainable development," and "sustainable transportation" in order to develop a basic understanding and framework for the report. Many barriers exist which confront planners, decision makers, and advocates when attempting to move a community along the path to sustainability, including cultural and behavioral, professional norms, economic development practices, and traditional planning practices. This report also presents several case studies which illustrate how communities, regions, and countries are approaching the problems associated with unsustainable transportation practices. These cases are supplemented by inventories of solutions to these barriers which are derived from further examinations of the research on and application of sustainability at the local level. Four categories of solutions are outlined: policy solutions, legislative solutions, planning solutions, and financial solutions. The findings from this study are then aggregated into a framework for the development of a scenario for sustainable transportation. This scenario consists of a modification model for transforming the traditional comprehensive planning process into one which integrates sustainability and objectives of sustainable development. This scenario presents a cyclical process for sustainable development from finance through implementation. The final section of the report focuses on the difficulty in integrating sustainability, as a concept, and sustainable development into professional practices

and paradigms. For sustainable transportation to "work" it must become ingrained in our practice as planners and engineers. This report is an attempt to move in this direction.

# EXECUTIVE SUMMARY

The concept of sustainability has been defined by William D. Ruckelshaus (1989) as "the doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense—by the interrelations of human beings and their works, the biosphere, and the physical and chemical laws that govern it. **It follows that environmental protection and economic development are complementary rather than antagonistic processes**."

Communities grow through complex interactions of private development and public regulation. Translation of the concepts of sustainable development into the processes of regional and local planning and development has been confounded by confusion over who pays and who benefits from such an approach. At the local level, residential and commercial land development is accomplished by private developers working under the direction of land use and development regulations by local jurisdictions. In practice, this system often results in staged development of residential and commercial areas, particularly in medium and small urban areas where large developers do not traditionally operate. Owners use the revenue from selling property and buildings in initial stages to continue developing adjoining property. Most sustainability development guidelines are easier to achieve, however, if public spaces can be developed as part of larger areas, where the public space can be amortized over more "revenue producing" units. The problem is that local practices and state laws are not consistent with optimal situations for urban land development companies. This condition suggests the need to explore how communities can move toward sustainability, as an objective, and how this concept can be funded and implemented successfully.

In this day of reduced budgets, fiscal constraints, and a demand from the public for increased accountability of transportation spending, innovative methods for financing transportation

projects need to be identified and evaluated in a comprehensive manner. While ISTEA has encouraged multimodal planning, flexible funding, and enhancement programs, little progress has been made to step beyond traditional financing methods and formulas. This situation is compounded through intergovernmental channels from the federal and state levels down to the local planning and development process.

There is a significant amount of research on the concept of sustainability, but little on how to encourage developers to use the principles of sustainability in construction or how to get cities to integrate these principles into their regulatory framework, or even on encouraging partnerships between these two important partners in land use. The major objective of this project is the development of a "primer" of innovative methods for the finance and implementation of sustainable developments. Through the use of case studies, the identification of specific methods, techniques, and policies, and scenario-building, this primer will provide direction for interested participants in the process of sustainability.

An introduction to the concepts of "sustainability," "sustainable development," and "sustainable transportation" is provided in this report. While there are a significant number of definitions for these concepts, the objective of this report is not to provide a definitive definition, but rather to develop a basic understanding and framework, and to direct those who might be interested in pursuing the definition debate further, a starting point from which to depart.

A multitude of barriers confront planners, decision makers, and advocates when attempting to move a community along the path to sustainability. Specific barriers that are discussed include: cultural and behavioral, professional norms, economic development practices, and traditional planning practices. Several cases of efforts in sustainability and sustainable transportation are described to illustrate how communities, regions, and countries are approaching the problems associated with unsustainable transportation practices. The literature and the evaluation of case

studies provides examples of "best practices" for identifying funding opportunities and successful regulatory frameworks for encouraging sustainable developments.

Inventories of solutions to these barriers are also included in this report. These inventories are derived from further examinations of the research on and application of sustainability at the local level. Four categories of solutions are outlined: Policy solutions, legislative solutions, planning solutions, and financial solutions. The case studies and inventories of solutions comprise the framework for the development of a scenario for sustainable transportation, which is presented in Chapter 6 of this report. This scenario consists of a modification model for transforming the traditional comprehensive planning process into one which integrates sustainability and objectives of sustainable development. Aggregating and incorporating "best practices" identified through the previous tasks, and the inventories of methods and techniques, this scenario presents the cyclical process for sustainable development from finance through implementation.

One of the significant barriers to sustainable transportation that is discussed in detail is that of the difficulty in integrating sustainability, as a concept, and sustainable development, as a practice, into professional praxis (Newman and Kenworthy 1999). For sustainable transportation to "work" it must become ingrained in our practice as planners and engineers. This report is an attempt to move in this direction.

**BARRIERS**

The development and implementation of sustainable transportation alternatives suggest change from traditional ways of doing business, and with the potential for change comes barriers as stakeholders resist these opportunities. What are the barriers to sustainable transportation with which public administrators must contend at the local level? For example, the Ontario, Canada, strategy for sustainable transportation identifies the lack of awareness and education as a fundamental barrier to sustainability (Transportation and Climate Change Collaborative 1995).

General categories of barriers to sustainability at the local level may include perceptual/behavioral, institutional/structural, and economic financial (Moore 1997). According to the Transportation Association of Canada, significant barriers exist between identifying the local vision for sustainable transportation and in turning the vision into reality. In general, these barriers include:

- lack of integration of administrative decisions among municipal agencies;
- competition among adjacent municipalities;
- an existing built area favoring urban sprawl;
- social forces, such as lifestyles accustomed to urban sprawl; and,
- market forces, such as developers resistant to innovative design (Transportation Association of Canada 1998).

More specifically, barriers to sustainable transportation at the local level may include cultural and behavioral barriers, professional norms as barriers, traditional economic development practices, and traditional urban planning methods and practices. Often, these barriers coexist, creating a seemingly insurmountable wall between the present and the future vision of what a sustainable community should become.

**CASE STUDIES**

In spite of the significant barriers to sustainability that exist at the local level, many communities are attempting to move toward more sustainable transportation alternatives. This report includes the following cases as example of this movement:

- the Town of Cary, North Carolina, Land Use Plan;
- Cape Cod, Massachusetts, Regional Policy Plan;
- Statewide Planning in Oregon, Deschutes County land use and transportation planning, and the Bend, Oregon, Area General Plan;
- Sustainability in Canada and the Vancouver CityPlan;
- Toronto's Greenest City Project; and

- The Brazos Greenways Council.

The cases illustrate the wide range of planning contexts and approaches that must be considered in an assessment of the concept of sustainability. Some contexts have national and state, or provincial, ramifications, while others are more localized. Some approaches to sustainability are broad and represent major movements toward a more sustainable future, while others are more incremental and narrowly defined. General observations from the case studies as they pertain to developing and implementing sustainable transportation alternatives include:

- *Scale is important*. Where, in the complex sphere of governmental jurisdictions, is the planning effort taking place? Is the effort local, regional, or being conducted at a higher level of government? Scale contributes to support and funding opportunities.
- *Transportation problems are intricately linked to other problems of sustainability*. One way to address this situation is by starting with a broad brush and working to the specific. The town of Cary, NC, developed its land use plan first and the vision for what the community wants to look like, for example. This provides the framework for later developing the transportation plan. Through this sequencing of plans, the community can plan its transportation actions around the vision, rather than letting transportation drive the process, as it were.
- *Advocates are important*. The Toronto Greenest City and the Brazos Greenways Council examples illustrate the importance of local advocates for sustainable transportation options. Without people willing to assume responsibility and take action to support their beliefs, many sustainability initiatives may never move forward.
- *Coordination and cooperation are important*. In a state with statewide planning, such as Oregon, the coordination of plans and actions must be coordinated. This situation encourages thinking beyond one location and in recognizing the impacts that single communities can have on the larger environment. Cooperation among planning institutions, too, is important as illustrated by the Vancouver case.

- *Communities can change*. The Town of Cary Land Use Plan shows a community in transition, from a typical suburb to one that is attempting to integrate concepts of sustainability through land use and design guidelines. Change may not be easy or swift, but it can be encouraged and supported.

**SOLUTIONS**

The experiences and lessons learned into an inventory of sustainable solutions can be aggregated into four general categories of solutions—policy solutions, legislative solutions, planning solutions, and financial solutions—although it should be obvious that the boundaries between these categories are ambiguous and porous. No clear demarcation exists:

- Policy solutions include those directives for moving toward sustainability that are expressed at any level, such as a city's policy to encourage pedestrian and cycling alternative modes of transportation.
- Legislative solutions include state or regional mandates and requirements for land use or transportation planning.
- Planning solutions may include techniques or methods that are applied in a community, such as street design, land use practices, or public participation in the planning process.
- Financial solutions are those which support investment in sustainable alternatives in the community, such as community land trusts, roadway pricing, or cooperatives.

**SCENARIO**

A general scenario model is developed in this report which can be used to assist the move toward a more sustainable community. The first step in model development is to identify traditional elements found in comprehensive plans and link their objectives to sustainability objectives and indicators. This linkage provides a transformation model that can help direct planners toward sustainability. The second step is to apply the model, which requires transformation of various

components of the planning process itself. The final step is a consideration of the political feasibility of moving toward sustainability and the role that the planner assumes in determining this feasibility. These steps develop a useful scenario-building tool for planners, public administrators, concerned citizens and advocates, and other stakeholders.

Many of the elements of a traditional comprehensive plan have direct equivalents with those found in sustainable development plans. These equivalent elements can be linked in a modification model that can be applied as a community seeks direction in moving toward sustainability. Based on the most common land use and transportation elements found in comprehensive plans, the model focuses on four main sectors: land use, transportation, environmental factors, and economic development.

Within a comprehensive plan, for example, each of these sectors support explicit objectives and methods. Traditional objectives and methods, even though they may form barriers to sustainability, can provide a common starting point for moving toward sustainability. Table ES-1 illustrates the linkages between the traditional and the sustainable objectives, as well as selected indicators of sustainability that can be applied. As a generalized modification model, the linkages in Table ES-1 can be expanded and adopted to localized conditions, availability of data, or political realities. The simple process of identifying traditional approaches to transportation and land use planning in a community, and linking them to sustainable approaches and indicators is an important first step in finding out where a community lies on the continuum between the unsustainable and the sustainable.

**Table ES-1. Modification Model for Sustainable Comprehensive Plans**

| Comprehensive Plan Elements | Traditional Objectives | Sustainability Objectives | Sustainability Indicators |
|---|---|---|---|
| Land Use | Zones and separated land uses | Integration of uses | Mixed use neighborhoods |
| | | Employment opportunity near res. | Job/housing balance |
| | Long-term approach based on current trends | Long-term approach based on changing attitudes and uses | Integration of sustainable measures |
| Transportation | Reduce congestion through construction | Reduce congestion through construction | VMT reduction, non-rec. Travel reduction |
| | Mobility | Mobility through alternative modes | Increased transit use |
| | | | Pedestrian/bicycle facility development |
| | Access through mobility | Access through alternative means | Telecommuting |
| Environmental | Provide adequate service levels | Provide efficient service levels | Water service density |
| | | | Reduce water usage per household |
| | | | Number of recycling households |
| | Landfill development as needed | Solid waste regeneration | Number of recycling businesses |
| | "Encourage" env. objectives | Mandate env. responsibility | Env. impact assessment in deve. review |
| Economic Development | Attract new business | Attract "green" business | Business recycling/ efficient resource use |
| | Suburban development | Urban in-fill/redevelopment | Regeneration |
| | Attract real estate development - subdivisions | Attract real estate development - transit oriented/mixed use | TOD development |

Applying the model involves a multi-step transformation process of four transformations: (1) transforming the objectives of a community and its plan, (2) transforming the plan itself, (3) transforming implementation of the plan, and (4) transforming the operational measures of success. As was suggested for the four basic elements of the modification model, these four steps of transformation can be considered independently as strategies are developed and pursued, yet all are integrated as they feed back into each other through the evolution of the overall system over time.

These four steps require separate consideration as distinct steps in a larger process, yet all build and depend on each other. This is not a linear or static process—each transformation step will influence the next, while at the same time suggest adjustment for each previous step. Each of the four steps contributes to the ultimate objective of local sustainability. In turn, as a community moves toward sustainability, it will influence further transformations. Also, a single transformation within a new comprehensive plan, such as the inclusion of any one of the objectives or indicators from the modification model, can encourage the further justification and transformation of larger scale community objectives. Figure ES-1 illustrates these relationships and the theoretical process flow of the four integrated transformations.

It should be stressed at this level of model building and generalization that the four transformations are, by necessity, simplistic representations of reality. Any one of these steps is a potentially painful, conflictual, and lengthy process. Model building requires such simplicity, however, as it aims to initiate discussion and serve as a spring board to contextual application.

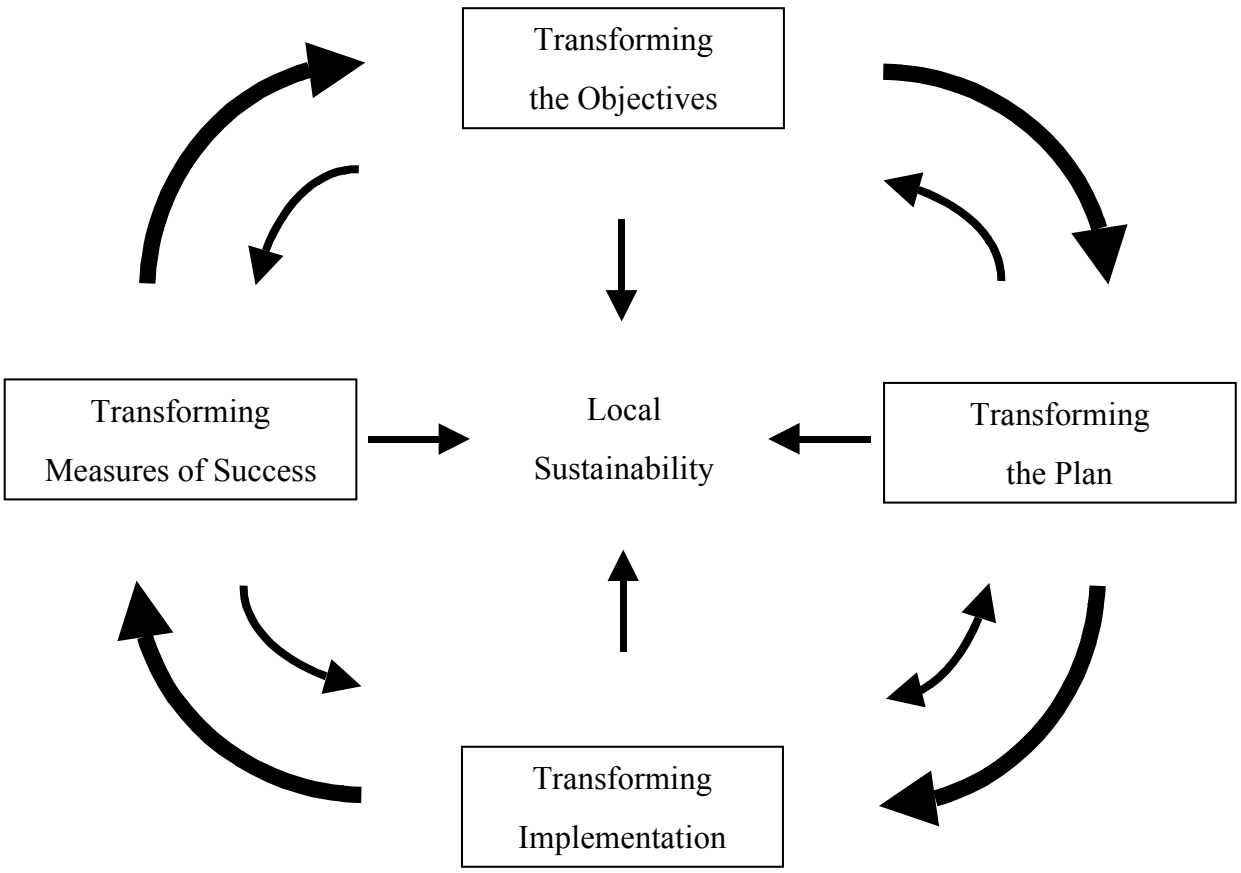


**Figure 3. Transformation Process Flow Model**

## POLITICAL FEASIBILITY AND THE ROLE OF THE PLANNER

The stark reality of urban planning in the United States is that a comprehensive plan and its associated processes are essentially political, and the pressures applied to their development and implementation are political in nature. Much of the literature on sustainable development underscores the difficulty in operationalizing and implementing its concepts because of the conflicts that inevitably arise, for example, between environmentalists and developers. Conflict between environmental and economic interests are often put at polar ends of a continuum, with consensus floating somewhere in the middle, if anywhere at all. Some studies of sustainable development are even devoted to conflict resolution techniques or consensus building (Campbell 1996; de Graaf et al. 1996). Because of the assumption of inevitable conflict, elected officials

often avoid considering sustainability as an alternative. The consensus needed between stakeholders may appear to be too elusive or take too long to negotiate for the short-term outlook of many politicians. The result at the local level will be inertia and an avoidance of change as any movement toward sustainability is interpreted as politically unacceptable (Reid 1995).

The local political climate will often dictate the rate and scale of sustainable objectives that are incorporated over time. A favorable political climate for change will support rapid and comprehensive change; an unfavorable climate will limit the possibilities for adoption and support only incremental change, if any at all. It is up to the sustainability advocates to gauge the political climate and determine how to proceed. Figure ES-2 illustrates a general assessment tool that can be used for determining the political climate for change for any of the elements included in the modification model. For example, if the political climate toward sustainable land use objectives is assessed as positive, the potential magnitude of change that can be encouraged is high. Conversely, if there is negative political support for alternative transportation modes, the scale of change that is pursued should be incremental. Once an assessment of potential change is made, transformation in those areas can be initiated through application of the modification model described in the previous section. This strategy does not guarantee that the political or economic climates will not change over time; however, it is easier for newly-elected politicians to support alternatives that have been implemented and proven successful than to initiate comprehensive changes from the ground up.

This approach to assessing the political climate for change suggests neither an incremental approach to change nor a more comprehensive approach. A strategic assessment of the political climate merely illustrates the opportunities available. In this manner, the approach to be promoted can be used as a starting point for the movement toward sustainability.

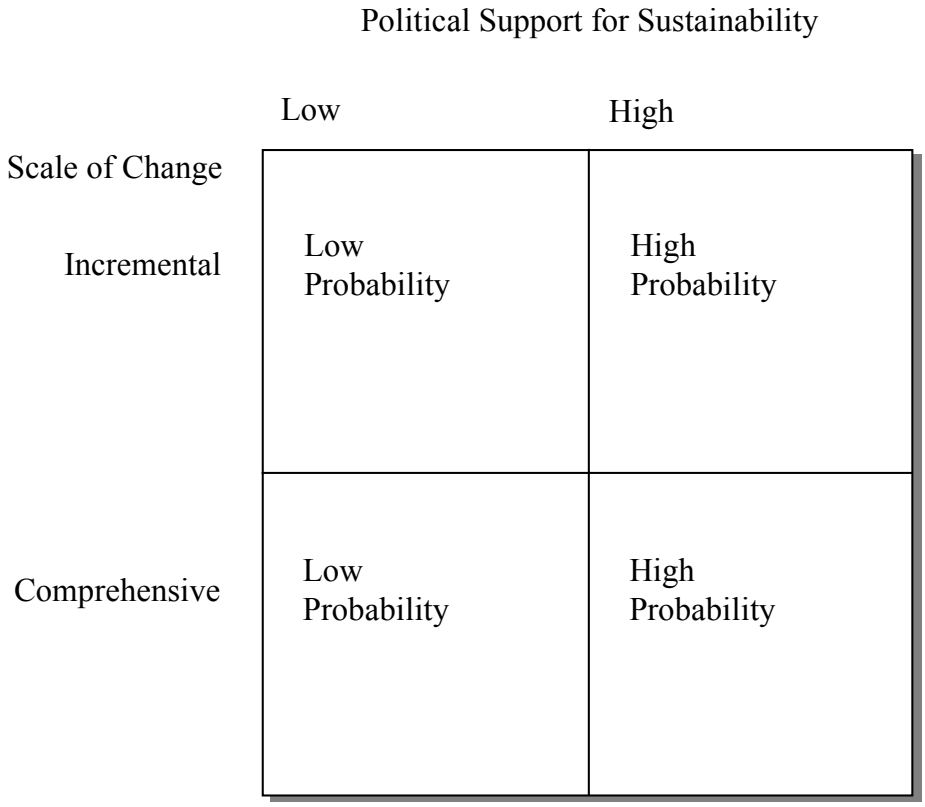


**Figure 4. Political Climate Assessment Tool**

It should be obvious that the number and diversity of potential stakeholders in sustainable development efforts, both supportive and non-supportive, are significant. From the perspective of this report and the modification model presented here, the community planner and planning agency are considered primary stakeholders in this effort. Community planners, whether through direct development of comprehensive plans or through interaction with consultants, are in a unique position, relative to elected officials, private or economic interests, and the general public. This position allows considerable discretion in assessing the political climate for change, assessing public and private attitudes toward sustainable development, refining sustainable objectives and adopting sustainable indicators, and in maintaining interest in and promoting the successes of a move toward sustainability.

## CONCLUSIONS

This report illustrates the significant barriers to moving toward sustainability and sustainable transportation that a community must contend with. In spite of these barriers, some communities, regions, and states are recognizing the impact transportation decisions have on the environment and quality of life and are making moves to reduce automobile dependency, integrate alternative modes into transportation plans, and incorporate general concepts of sustainability into community visions. This final chapter offers some conclusions derived from this report, some observations on the state of sustainable transportation, as well as some recommendations for community planning, and for further research.

The ambiguous nature of the term "sustainable development" and its derivatives, encourages extraordinary debate, anxiety, and frustration. Debate occurs when parties attempt to refine the concept too specifically to the detriment of the overall idea and objective; anxiety occurs when traditionalists are confronted with the necessity or stimulus to change their approach and attitude; frustration occurs when debate and anxiety collide in the real world of transportation planning and decision making. The significance of the concept of sustainability lies not in its definition, however, but in its application. The cases included in this report illustrate a wide variety of approaches, methods, and techniques that are being applied as communities move beyond the "way things have always been done" to the "way things can be done and should be done."

Recommendations included in this report are in two categories: recommendations for communities, planning agencies, and transportation agencies, and recommendations for further research:

- Sustainability and sustainable transportation need to be linked to the vision of the future that a community formulates. It is in this process that these concepts will gain a foothold that can be built upon as a community evolves. Unless a community

recognizes the negative implications of unsustainable practices, it will be very difficult to move forward.

- The planning and development processes in a community or agency need to be open to public participation in order for the vision to take hold. Providing a forum for ideas and alternatives is critical for moving toward sustainability.
- Planning and economic development processes need to be integrated. The conflict between these two is reflected in the different attitudes, objectives, and professional norms of planners and developers.
- The traditional paradigms of engineering and planning, as they are applied in a community, need to be evaluated for their relevance to sustainability. Do adjustments need to be made in how we operate in a "sustainable" world? One area which should be scrutinized is the standard operating procedures of community engineering and planning agencies. Are these procedures actually barriers to change and the integration of sustainable concepts?
- Community, as well as regional and state-level, financial decision making needs to be more open to the opportunities provided by sustainable development initiatives. The cases shown in this report include some success in moving in this direction, but unless significant changes are made in how we finance development and perceive financial risk in the community, the move toward sustainability will be more difficult.

Research efforts in the future should be focused on several areas:

- Communities and the research community need to focus on collecting data and collection methods for compiling sustainability indicators. Traditional indicators are not sufficient to support sustainable objectives. Additional indicators, such as quality of life and more qualitative indicators, need to be developed and applied in the community to direct decision makers.

- The role of institutions, such as state transportation agencies, planning agencies, and public works departments, needs to be evaluated in regard to how they may, or may not, respond to the integration of sustainability as an objective. Under what conditions are institutions more likely to embrace sustainability as an objective?
- Finally, what is the role of planning, public administration, and engineering education playing the move toward sustainable communities? The education of professionals is critical to the achievement of sustainable objectives at any scale. Are we doing enough to encourage change in how professionals are educated to move effectively toward a more sustainable future?

This report has illuminated many examples of planning and development rhetoric that "encourages" or "supports" sustainability. A final normative question needs to be asked, however, and that is: can plans, and planners, ever move beyond "encouraging" sustainability, to "requiring" sustainability? If we continue on an unsustainable path of transportation alternatives and decisions, will we eventually have to mandate sustainability within our society? Perhaps the Oregon model comes closest to this situation, at this time, yet even it has had to withstand constant pressure and scrutiny over the past 25 years, and its future is in constant doubt. This report identifies many alternatives to mandated sustainability that can be achieved through advocacy and cooperation, as well as methods for integrating the objectives of sustainability into the planning process. These alternatives are available for application in the development, finance, and implementation of sustainable transportation in the community, provided the will and vision are there to open a window of opportunity.

# TABLE OF CONTENTS

Page

LIST OF FIGURES . . . . . xxv

LIST OF TABLES . . . . . xxvi

DISCLAIMER . . . . . xxvii

ACKNOWLEDGMENTS . . . . . xxviii

CHAPTER 1: INTRODUCTION . . . . . 1

CHAPTER 2: UNDERSTANDING SUSTAINABILITY AND TRANSPORTATION . . . . . 5
DEFINING SUSTAINABILITY . . . . . 5
SUSTAINABLE TRANSPORTATION . . . . . 7
Transportation in Sustainable Development . . . . . 8
Defining Sustainable Transportation . . . . . 9
SUSTAINABLE TRANSPORTATION IN THE LOCAL CONTEXT . . . . . 11

CHAPTER 3: LOCAL BARRIERS TO SUSTAINABLE TRANSPORTATION . . . . . 15
Cultural and Behavioral Barriers . . . . . 16
Professional Norms as Barriers . . . . . 17
Economic Development Practices as Barriers . . . . . 19
Traditional Planning Methods and Practices in Texas . . . . . 20

CHAPTER 4: CASE STUDIES . . . . . 27
Cary, North Carolina, Land Use Plan . . . . . 27
Cape Cod Regional Policy Plan . . . . . 36
Statewide Planning in Oregon . . . . . 40
Sustainability in Canada and the Vancouver CityPlan . . . . . 48
Schools and Sustainable Transportation Toronto's Greenest City Project . . . . . 62
The Brazos Greenways Council . . . . . 64
Discussion of Cases . . . . . 68

# TABLE OF CONTENTS

Page

CHAPTER 5: SOLUTIONS FOR SUSTAINABLE TRANSPORTATION . . . . . 71
POLICY SOLUTIONS . . . . . 71
LEGISLATIVE SOLUTIONS . . . . . 73
PLANNING SOLUTIONS . . . . . 75
FINANCIAL SOLUTIONS . . . . . 79

CHAPTER 6: A SCENARIO FOR SUSTAINABLE TRANSPORTATION . . . . . 85
STEP ONE: MODIFYING THE COMPREHENSIVE PLAN . . . . . 85
STEP TWO: APPLYING THE MODEL . . . . . 86
Transforming the Objectives . . . . . 86
Transforming the Plan . . . . . 88
Transforming Implementation . . . . . 88
Transforming Operational Measures of Success . . . . . 89
Summarizing the Transformation Process . . . . . 89
Political Feasibility and the Role of the Planner . . . . . 90
Political Feasibility . . . . . 91
The Role of the Planner . . . . . 93

CHAPTER 7: CONCLUSIONS . . . . . 95
RECOMMENDATIONS . . . . . 95

REFERENCES . . . . . 99

APPENDIX A . . . . . 107

APPENDIX B . . . . . 111

# LIST OF FIGURES

Page

Figure 1. Town of Cary: Urban Model . . . . . 32
Figure 2. Town of Cary: Activity Center Conceptual Model . . . . . 34
Figure 3. Transformation Process Flow Model . . . . . 90
Figure 4. Political Climate Assessment Tool . . . . . 93

# LIST OF TABLES

Page

Table 1. Policies and Measures in Current Use . . . . . 21
Table 2. Land Usage Demand per Capita (in acres per 1,000 pop.) . . . . . 30
Table 3. Residential Category Attributes . . . . . 35
Table 4. Transport Canada's Sustainable Development Section Plan . . . . . 53
Table 5. The Phases and Tasks of the Local Development Planning Process . . . . . 74
Table 6. Modification Model for Sustainable Comprehensive Plans . . . . . 87

# DISCLAIMER

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Chapter 3 focuses on the multitude of barriers that can confront planners, decision makers, and advocates when attempting to move a community along the path to sustainability. Specific barriers that are discussed include: cultural and behavioral, professional norms, economic development practices, and traditional planning practices. Chapter 4 presents several cases of efforts in sustainability and sustainable transportation which illustrate how communities, regions, and countries are approaching the problems associated with unsustainable transportation

practices. The literature and the evaluation of case studies provide examples of "best practices" for identifying funding opportunities and successful regulatory frameworks for encouraging sustainable developments.

Inventories of solutions to these barriers are included in Chapter 5. These inventories are derived from further examinations of the research on and application of sustainability at the local level. Four categories of solutions are outlined: policy solutions, legislative solutions, planning solutions, and financial solutions. Chapters 4 and 5 comprise the framework for the development of a scenario for sustainable transportation, which is presented in Chapter 6. This scenario consists of a modification model for transforming the traditional comprehensive planning process into one which integrates sustainability and objectives of sustainable development. Aggregating and incorporating "best practices" identified through the previous tasks, and the inventories of methods and techniques, this scenario presents the cyclical process for sustainable development from finance through implementation.

One of the significant barriers to sustainable transportation that will be discussed in detail in the ensuing chapters, is that of the difficulty in integrating sustainability, as a concept, and sustainable development, as a practice, into professional praxis (Newman and Kenworthy 1999). For sustainable transportation to "work" it must become ingrained in our practice as planners and engineers. This report is an attempt to move in this direction.

# CHAPTER 2: UNDERSTANDING SUSTAINABILITY AND TRANSPORTATION

This chapter introduces three important concepts that provide the theoretical framework for this report. First, a consideration of the various definitions of "sustainability" and "sustainable development" is provided. This general overview of the many attributes of these concepts establishes the conceptual context for this report. The second section moves to a more specific consideration of sustainability from a transport perspective. Two questions are posed: why is transportation of such importance to the concept of sustainability, and how is sustainable transportation defined? Finally, a justification for implementing sustainable transportation initiatives at the local level is presented. This section provides the rationale for considering what is often viewed as a global concept, sustainability, in a localized context. These three concepts frame the rest of the report and provide for a general understanding of the important concepts discussed here.

## DEFINING SUSTAINABILITY

"Sustainability is a vision and a process, not an end product" (Newman and Kenworthy 1999).

The concept of sustainability is much debated and argued over; one source lists over 40 different definitions of the concept, while another recognizes over 70 (Holmberg and Sandbrook 1992). Although the diversity of the concept has lent itself to be overly scrutinized and criticized, a brief consideration of a few of the definitions is useful in order to identify the similarities in the definitions, as well as instructive, as it establishes the underlying theoretical framework for this report.

The Bruntland Report, published in 1987 as a result of a United Nations request, provides, perhaps, the most common definition as it states that "sustainable" development is that which "meets the needs of the present without compromising the ability of future generations to meet

their own needs" (World Commission on Environment and Development 1987). This definition was subsequently adopted by the President's Council on Sustainable Development, which was established by President Clinton in 1993 (President's Council on Sustainable Development 1999). This far-reaching definition includes many components, such as forestry, energy, industry, and transportation. An underlying concern of this SWUTC report is how transportation is linked with the other components, such as land use, housing, or agriculture, in the local context.

Nijkamp (1994) provides a refined definition of sustainable development, as he states:

> Development is—ecologically—sustainable when long-run (per capita) social welfare improvement is not impeded by environmental deterioration, either through environmental amenities or through environmental productivity or through a combination of the two."

Newman and Kenworthy (1999) suggests that "sustainable development, or *sustainability* for short, is easily understood at its most basic level. It means simply that in a global context, any economic or social development should improve, not harm, the environment."

In his review of the evolution of sustainability, Kidd (1992) provides a concise statement, not about how to define sustainability, but on the importance of clarity of definition:

> "... there is not, and should not be, any single definition of sustainability that is more logical and productive than other definitions. The central point...is that those who use the term 'sustainability' should always state precisely what they mean by the term. This approach, as contrasted with what I consider a misguided search for the 'proper' definition, has the potential of furthering productive work while avoiding needless controversy" (Kidd 1992:3).

There are many more definitions and interpretations of sustainability. As this brief overview illustrates, the concept of sustainability can be defined in many different terms by different stakeholders. The seeming simplicity of this concept encourages analysis, criticism, and speculation. Yet, the definitions all focus on several major components and relationships: the relationship between the present and the future, the relationship between human development activities and their impacts on the environment over time, and the relationship between the local and the global as integrated environments.

Two important observations can be made at this time in order to establish the framework for the rest of this report. First, context is critical when attempting to define what "sustainability" or "sustainable development" mean in a planning environment. Sustainability may be easier to define in certain contexts than in others (Beatley 1995) and that the indigenous stakeholders may be able to develop the most appropriate definition. Second, the ambiguous nature of the terms should be viewed in a positive light as interest and discussion over issues of sustainability results from positive concern on these issues. In addition, ambiguity can lead to innovation as stakeholders strive to deal with linking concept to action.

It is with this rhetorical context that transportation planners and decision makers must contend as transportation and infrastructure decisions are made today that will significantly impact the quality of life for future generations. The next section attempts to narrow this rhetoric by focusing on how transportation relates to the concept of sustainability.

## SUSTAINABLE TRANSPORTATION

This section considers two important questions related to developing and implementing locally sustainable transportation opportunities: 1) why is transportation such a major concern within the context of sustainability and 2) how is sustainable transportation defined?

**Transportation in Sustainable Development**

The literature on transportation and sustainable development is unequivocal: current transportation policies are unsustainable. This section explores this assumption and outlines the major arguments for this position.

In general, two major arguments point to the unsustainability of transportation policy and its effect on the environment: its consumptive nature, of non-renewable resources; and its environmental impact (Ferrary 1995). According to the Transportation and Climate Change Collaborative in Ontario, Canada, the transportation sector has been identified as the largest contributor of carbon dioxide emissions in Canada (1995). Nijkamp (1994) cites air pollution, noise pollution, landscape deterioration, fatalities, and congestion as indicators of transport unsustainability. Black (1996) expands upon these arguments with a list of reasons for the unsustainability of current transport systems:

- Petroleum reserves are finite.
- Petroleum-based emissions impact on air quality.
- Petroleum-based emissions are detrimental to the global environment.
- Motor vehicle coolants are destroying the ozone shield.
- Motor vehicle accidents produce excessive injuries and fatalities.
- Transport facilities which are congested.
- Transport policies which induce urban sprawl.

Social costs from transportation policies can also be included in the equation, such as lost productivity, military costs of securing oil supplies, water pollution from petroleum spills, and global warming (Gordon 1995). Further, transport seems to attract a "disproportionate" share of the negative attention as one element in the sustainability concept, due in part to 1) its significant presence in all levels of the sustainability argument (local, transboundary, and global), 2) the general perception of its significant contribution to environmental problems, 3) its interaction

and impact with other areas of concern, such as tourism, agriculture, and land development, and 4) the traditional regulatory and planning nature of transportation policy, which often places mobility above the ecological impacts of transportation decisions (Banister and Button 1993).

**Defining Sustainable Transportation**

Having identified many of the reasons that transportation systems and policies are considered unsustainable, how does this translate into a definition of "sustainable transportation"? As the brief summary of diverse definitions of the overall concept of sustainability illustrates, there are also many different perspectives on what constitutes sustainable transportation.

The World Bank (1996), for example, states:

> "A policy for sustainable transport is one that identifies and implements the win-win policy instruments and explicitly confronts the tradeoffs so that the balance is chosen rather than accidently arrived at. It is a policy of informed, conscious choices."

Black defines sustainable transportation simply as "satisfying current transport and mobility needs without compromising the ability of future generations to meet these needs" (Black 1996). Similarly, Replogle defines sustainable transportation strategies as "those that can meet the basic mobility needs of all and be sustained into the foreseeable future without destruction of the local or planetary resource base" (1991).

The Center for Sustainable Transportation defines a sustainable transportation system as one which:

- allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations;

- is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy; and
- limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, reuses and recycles its components, and minimizes the use of land and the production of noise (1998).

Holmes (1997) recognizes the importance of social equity and environmental justice within a definition of sustainable transportation. He identifies several principles that should direct a social justice approach to transportation planning:

- Transportation is a social investment.
- Transportation projects should reshape inefficient land use patterns and reduce negative environmental impacts.
- Transportation decision-making should be bottom up, rather than top-down, and involve the full community in the process.
- An integrated land use, community development, and environmental process should inform transportation investment decisions in a community.

Finally, the Transportation Association of Canada defines a sustainable urban transportation systems as one which:

- limits emissions and waste within the area's ability to absorb, is powered by renewable energy resources, recycles its components, and minimizes the use of land;
- provides equitable access for people and their goods and helps achieve a healthy and desirable quality of life in each generation; and
- is financially affordable, operates at maximum efficiency, and supports a vibrant economy (Duncan and Hartman 1996).

Other approaches prefer to focus on the specific elements of sustainable transportation, rather than providing a definitive definition, such as the Transportation Research Board (1997) report on the impact of the automobile on long-term environmental problems. Still other approaches define inclusive elements, such as social, economic, and environmental factors, as critical components of sustainability (Transportation and Climate Change Collaborative 1995).

## SUSTAINABLE TRANSPORTATION IN THE LOCAL CONTEXT

The previous two sections defined the general concepts of sustainability and sustainable transportation. Although these concepts are often argued from a global perspective, they have significance at the local level. This section considers this assumption by offering a justification for local initiatives for sustainable transportation efforts in the planning context. The primary question can be framed as "Why should sustainability and sustainable development be considered in a local planning context?"

Much of what has been written regarding sustainable development focuses on developing countries or takes a global perspective (World Commission on Environment and Development 1987). The basic definitions, too, suggest a macro-problem in need of macro-solutions. The Brundtland definition is, perhaps, the most often quoted: sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1987). Following this definition, then, sustainable development might be considered something that only individual nations or unions have the resources to pursue. The ambiguity of this definition, however, leaves the appropriate scale at which to attempt sustainable development open to interpretation.

Selman (1995) supports sustainability at a local scale through his discussion of the revival of community planning. In his assessment, local planning should be a primary location for the move toward sustainability as the basic objectives of sustainability have been indigenous in

planning for years: protection of prime resources through land use planning and management of the demands on local resources. Further, he cites local planning in its traditional responsibilities of consultation, policy generation, land use control, and conflict mediation, as a natural advocate for sustainability and sustainable development.

The long-term approach found in comprehensive local planning initiatives also provides an underlying support for the necessary long-term approach that an objective of sustainability requires. Campbell (1996) suggests that although "sustainability" as a term is vague, it can be modified and defined in the planning context to be beneficial as planners move toward a more balanced economic/environmental system. One problem identified in much of the literature on sustainable development and local planning, however, is a lack of practical guidance to get from "here to there" (Campbell 1996; Reid 1995).

The arguments for moving toward sustainability, specifically in regard to transportation, are equally compelling. As stated in the previous section, there are several reasons why the present transport system in the United States is unsustainable. Those with particular relevance for local land use and transportation planning are the congested nature of current facilities and the urban sprawl induced by current levels of use. Although the federal- and state-level transportation agencies are responsible for much of the construction and maintenance of the roadway system in the United States, local governments have considerable power over local land use decisions.

The American Planning Association identifies six unsustainable practices, most of which have a transportation linkage that are relevant for local decision makers:

- suburban sprawl;
- segregation/unequal opportunity;
- loss of agricultural land and open space;
- depletion and degradation of groundwater resources;

- traffic congestion and smog; and
- disproportionate exposure to environmental hazards (American Planning Association 1999).

These practices are significantly linked to local transportation-related decisions made by planners, developers, and administrators, and as such, can be addressed by them in order to move towards more sustainable local practices.

The nature of problems associated with sustainability can help define the most appropriate scale at which to attempt solutions. Some problems, such as emissions, require global applications, while others, such as problems associated with a regional water aquifer, require a more localized solution. Local sustainable solutions may be defined by the boundaries of governmental jurisdictions. In other words, what can a local entity influence (Jacobs 1993)? Recognizing the boundaries and limits of these jurisdictions as they relate to sustainable transportation is of particular concern for public administrators.

Finally, Rees suggests that the local context provides the most appropriate context for sustainability. He introduces the concept of "urban leverage" as a means of moving toward sustainability. By virtue of the shear numbers of people located in urban communities, a population that strives to integrate more sustainable practices into local decision making and administration practices can have a significant impact on the future of the community (Rees 1995).

In summary, although broad concepts such as sustainable development or sustainability suggest an enormity of problems far beyond the scope of local planning, there is considerable justification for moving toward sustainability at the local level. It is often stated that all politics is local. If this statement has any validity, surely, sustainability should be local, too.

# CHAPTER 3: LOCAL BARRIERS TO SUSTAINABLE TRANSPORTATION

The development and implementation of sustainable transportation alternatives suggests change from traditional ways of doing business, and with the potential for change comes barriers as stakeholders resist these opportunities. What are the barriers to sustainable transportation with which public administrators must contend at the local level? For example, the Ontario, Canada, strategy for sustainable transportation identifies the lack of awareness and education as a fundamental barrier to sustainability (Transportation and Climate Change Collaborative 1995). This section briefly discusses some of the significant barriers to sustainable transportation that public administrators may face. As an example, the final section considers traditional urban planning practices in Texas and identifies problems they create for communities interested in moving toward sustainability.

General categories of barriers to sustainability at the local level may include perceptual/behavioral, institutional/structural, and economic financial (Moore 1997). According to the Transportation Association of Canada, significant barriers exist between identifying the local vision for sustainable transportation and in turning the vision into reality. In general, these barriers include:

- lack of integration of administrative decisions among municipal agencies;
- competition among adjacent municipalities;
- an existing built area favoring urban sprawl;
- social forces, such as lifestyles accustomed to urban sprawl; and
- market forces, such as developers resistant to innovative design (Transportation Association of Canada 1998).

More specifically, barriers to sustainable transportation at the local level may include cultural and behavioral barriers, professional norms as barriers, traditional economic development practices, and traditional urban planning methods and practices. Often, these barriers coexist, creating a seemingly insurmountable wall between the present and future vision of what a sustainable community should become.

**Cultural and Behavioral Barriers**

Cultural and behavioral barriers manifest themselves in many ways in the United States, including our preferences for single family housing and use of the automobile over alternative modes of transportation. Preferences for large-lot developments, despite the costs that are associated with them at the municipal level, contribute to urban sprawl. Development of a linear system, like that associated with low density, large-lot developments, are significantly more expensive in terms of street, sewer, water, and stormwater infrastructure expenditures (Benner 1998).

The preference Americans show for the automobile, over alternative modes of transportation, is a significant barrier to sustainable transportation alternatives. According to Newman and Kenworthy, the cultural priorities of automobile dependence in urban areas can be seen in the following ways:

- The ideal home, or the American Dream, is typically represented as a separate, one story, house.
- The environmental, economic, and social costs of low-density sprawl is seldom presented, or considered in traditional planning efforts.
- "Space," as in living in a large lot house, is equated with "health" of the occupant. This perspective frequently suggests density, of dwelling units, to be an "un-healthy" environment.

- Country living is still often portrayed as a better moral and social environment in which to live. This attitude further encourages urban sprawl and linear development patterns.
- A separate house, with large yards, is considered a better environment for raising children than are higher density alternatives (1999).

The sales decline of fuel efficient cars and a corresponding rise in popularity of fuel-inefficient sport utility vehicles (SUVs) in the United States is, perhaps, the latest in a long line of culturally based unsustainable transportation practices (Benfield et al. 1999). The culture of the automobile is also being exported from the United States to other countries, and increased automobile dependence is adding additional stress on developing countries worldwide as they attempt to accommodate this culture (Newman and Kenworthy 1999).

How individuals and society make decisions has also been identified as the most difficult behavioral barrier to sustainable transportation initiatives:

> "We must invent new decision-making processes for governments, corporations, and individuals. This is an institutional problem which permeates all aspects of the issue from lack of harmonized government policies—to resistance by industry—to individual choices about how and where people live, work, and travel (Duncan and Hartman 1996).

**Professional Norms as Barriers**

The professions most often associated with developing and implementing transportation alternatives in a local context, whether sustainable or not, are developers, planners, and public administrators involved with land use decision making. The values, biases, and ethical perspectives that these actors bring to the table have significant impacts on whether or not sustainable transportation alternatives will be supported and implemented. From the perspective

of a public administrator, the focus of this chapter will be on barriers to the concept of sustainable transportation that are present in the planning profession.

Several recent studies have focused on the impact of "sustainability" or "sustainable development" on the planning profession. The Canadian Institute of Planning, for example, recognizes two specific challenges to the profession: 1) the acceptance of sustainability within the discipline as a core value; and 2) the problems associated with the public lack of acceptance of sustainability as a concept (1990). Although planning as a profession is recognized as a logical advocate and supporter of sustainability, when considering its focus on long-term scenarios and concern for quality of life issues, among other reasons, planners are too often concerned with short-term development decision making, or are unwilling to advocate for any paradigm beyond that which is immediately supported in their specific political and economic environments (Rees 1995).

Developing and implementing sustainability, in general, and sustainable transportation, in particular, will also require planners to cross disciplinary boundaries. Traditional civil engineering and planning approaches to transportation will have to be integrated with input from environmental sciences, communications, and sociology among others (Newman and Kenworthy 1999). Within the planning profession, too, there exists a distinction between general urban planning and "environmental" planning. Most urban communities are well staffed with general planners, yet both kinds are needed for developing sustainable solutions to transportation problems (Briassoulis 1989; Slocombe 1993). Public administrators are in the unique position to recognize at the local level what areas of expertise are available within the public sector and what areas need to be drawn into the process from the private sector and community groups.

Related to a consideration of professional norms as barriers to sustainability is the lack of a regional focus in planning efforts in the United States. Transportation, much like air pollution in

general, cuts across jurisdictional boundaries, yet there remains competition among adjacent jurisdictions in competing for funds. This competitive mentality also encourages a lack of cooperation at the regional level among agencies and administrators. While regionalism, as a planning concept, was evident prior to World War Two, it has yet to regain much prominence partly as a result of political and economic realities in the urban environment (Slocombe 1993). The Urban Land Institute, however, has recently identified regionalism as a necessity for the future of metropolitan areas that will have to develop shared programs for transportation, emergency response, water resources, and other elements of the urban fabric that cut across traditional municipal boundaries (Hudnutt 1999).

The business of land development and how its participants view sustainability as a goal also contributes to non-sustainable transportation practices. For example, the building industry has been slow to move towards sustainability, in both its practices as they relate to the reduction of building waste and to the adoption of "green" building techniques. This hesitancy may be attributed to a variety of conditions, including: risk-averse financial institutions that are unsure anything new and are therefore unwilling to lend for sustainable developments; a lack of interest in the industry of learning "new tricks" even if by doing so they would contribute to a greater quality of life in the community; and the lack of interested developers willing to link up with green builders and form "sustainable partnerships" (Wilson et al. 1998). Land development, as any business, is often reluctant to seek out change that will alter a comfortable and understood way of doing business.

**Economic Development Practices as Barriers**

The economic development of a city depends upon a complex relationship between private developers and public agencies charged with directing, regulating, and monitoring the developments as they are proposed and evolve. The process of economic development, in general, refers to the efforts a community undertakes to identify areas of potential economic

growth, and in providing the means to achieve that growth in order to improve the quality of life in the community. More jobs and an improved quality of life are desired products from the economic development process. The product may, however, take precedence over the process, resulting from an overemphasis on benefits, with only a cursory look at the costs (Blakely 1994; Gubula 1995).

The process itself is often followed with little input from the community. Table 1 shows the basic phases and tasks of the local economic development process. There is very little opportunity in this process for community involvement.

Economic development decisions can have major impacts on transportation, and these decisions may create barriers to sustainable transportation alternatives in a community. For example, a decision to provide financial incentives to a firm may be influenced by the perceived benefits of the number of jobs that are attached. The full costs of a development project or program may not be apparent until later, when location and design of the facility results in an increase in traffic in the area. Even if comprehensive planning designates an area as a slow or no-growth area, the lure of economic development and more jobs can persevere. The long-term process of planning, at times, conflicts with the short-term product goals of economic development (Gubala 1995). Unless economic development is coordinated strategically with comprehensive planning, the result may be continued unsustainable practices within a community.

**Traditional Planning Methods and Practices in Texas**

For a planner, public administrator, or advocate seeking the means of integrating sustainability into a community's consciousness, significant barriers are raised by traditional and accepted methods and practices of land use planning. This section describes these practices, in general, and identifies the barriers they present in moving toward sustainability at the local level, particularly in Texas.

**Table 1. Policies and Measures in Current Use**

**Planning Measures**

- Strategic policy for land use and transport planing
- Regional policy affecting economic development in different areas of the country
- Restraint on economic growth of principal city centres
- Designated cities or areas for growth/control over the pattern of development
- Relocation of particular employment groups/sectors
- Use of preferred locations for travel-generating activities (e.g., town centres)
- Fiscal inducements to relocate in designated areas
- Zoning regulations (single use, mixed use, densities, etc.)
- Green belts
- Regeneration of decaying areas (city centres, inner-city areas)
- Improvements to housing and neighborhood quality/facilities
- Parking standards for new developments

**Transport Supply Measures**

- Road construction
- Rail investment/construction
- Improved public transport service/fares, ticketing, and information
- Traffic management, driver information
- Park-and-ride
- Pedestrian areas, cycle, and walkways

**Transport Demand Management**

- Car restraint/road pricing
- Toll charges
- Parking controls
- Entry prohibitions
- Goods traffic restraint
- Pedestrian priority
- Cycle priority
- A bus/tram priority
- Traffic calming
- Car pooling/sharing

**Targets and Standards**

- Targets for improved road safety, reduction of noise and air pollution levels
- Targets for reduced traffic levels, certain types of traffic (e.g., heavy goods vehicles) and car park supply
- Targets for reduced fuel consumption and $CO_2$ emissions
- Targets for increased car pooling, public transport use, cycling, and walking
- Standards for vehicle noise, emission control, and safety

Source: Blakely (1994)

Comprehensive planning has been defined as "a process by which a community assesses what it has, expresses what it wants, decides how to achieve its wants, and, finally, implements what it wants (Efrussy1992). According to the Texas Chapter of the American Planning Association, a comprehensive plan is usually a long-range plan which sets out directions for community growth and development of physical components, such as housing, transportation, recreation, and public facilities. It will also "serve as the basis for future development recommendations" (Efrussy 1992). Branch (1985) focuses on the procedure of planning: "The process of city planning involves a *procedure* for gathering information, making recommendations, and taking action." Another definition of the comprehensive plan states that the "geographic scope is the entire community and its regional environment," and that "the time scale is long range or indefinite. Such a plan is comprehensive in that it tries to link long-range objectives to a number of interdependent elements, including population growth, economic development, land use, transportation, and community facilities" (So and Getzels 1987).

Defined as such, the comprehensive plan represents a logical instrument for integrating and implementing the concepts of sustainable development and sustainability into a community, particularly as sustainability has been defined as "a fundamental organizing principle against which to evaluate all of a community's proposed actions and policies" (Beatley and Brower 1993). Planning for sustainability requires long-term, regional, and integrative approaches, and these definitions elaborate the complimentary nature of the concepts of sustainability and comprehensive planning. As a snapshot in time, the comprehensive plan represents a common understanding of the condition and history of the community for reference by stakeholders. Beatley suggests that a first step toward community sustainability is the development of indexes to provide a benchmark of current conditions (Beatley 1995). An existing comprehensive plan can serve as this baseline, or linking mechanism, with which to move a community forward. In regard to sustainable transportation, then, the comprehensive plan and its land use and

transportation elements, provides a baseline from which to initiate the process of transformation toward more sustainable local planning efforts.

Four main components of a comprehensive plan have significant transportation implications for a community: the land use component, the environmental component, the economic development component, and the transportation component. Within each of these elements potential conflicts may arise between traditional approaches to planning and the integration of sustainability objectives and measures.

*Land Use*

Typically land use components within comprehensive plans describe existing conditions and types of land uses, then outline objectives and directions for future development and uses. Most future visions of land use will not vary significantly from existing uses. Communities are usually comfortable with, or resigned to living with, existing divisions of land use and strive to maintain an equilibrium of uses in developed areas and reduce potential conflicts among uses in developing or undeveloped areas within local jurisdictions. In a community with traditional zoning regulations supporting separation of land uses, however, the suggestion of integrating retail, office, or light industrial uses into, or adjacent to, residential areas may ignite community conflict. For example, the recently revised and adopted comprehensive plan for College Station, Texas (1997), states as one land use objective, that the city should "develop standards for providing appropriate buffering and screening between residential and non-residential uses." Although buffering between non-compatible uses is traditionally used to mitigate potential negative impacts, it sustains the ideology that diverse land uses should be separated, discouraging attempts at integrating alternative uses into homogenous areas of the community. Such integration is one of the primary objectives of sustainable development as it encourages shorter travel times, alternative transportation usage, and provides employment opportunities closer to residential centers.

*Transportation*

The reduction of vehicular traffic, travel times, congestion, and the promotion of mass transit and alternatives modes of transportation, are primary objectives of sustainable development. In the United States, however, local transportation plans often aim at maintaining the status quo in regard to automobile use. Changes in this philosophy are marginal at best and usually take the form of merely "encouraging the use of alternate modes of transportation," or a stated reliance on road building and redevelopment as a means of reducing congestion (City of College Station 1997). Neither of these intentions express a sincere effort to move toward transport sustainability.

One of the primary conflicts between traditional planning efforts and sustainable development can be illustrated by considering differences between mobility and access. In general, mobility is expressed as the ability of the local population to increase the ease with which they are able to move about in the community, without consideration for altering the means. The actions needed to increase mobility, however, may reduce the quality of life in the community through excessive development costs and landscape degradation. Mobility, from a sustainable perspective, will consider alternative modes of transportation to achieve increased mobility. Similarly, accessibility in the traditional context assumes a desire to physically move between activity centers. Accessibility in a sustainable context would also include access through telecommunications and through integrating land uses in order to reduce the need to move between single-activity centers (Gudmundsson and Hojer 1996).

*Environmental Factors*

The environmental impacts of local land use and transportation planning decisions may seem of a relatively small scale when compared to concerns over global warming or the depletion of the rain forests. The environmental impact of these small scale and seemingly disparate decisions may accumulate into major and costly local problems, however. Environmental factors do

represent a significant linkage opportunity between traditional comprehensive planning approaches and those of sustainable development, particularly as they relate to transportation, air quality, and flood plain development.

One contributing factor in local environmental problems is that although land use, transportation, and environmental decisions all interact in a systematic manner, they are often considered separately in the policy definition and implementation stages of local planning. For example, development interests may take precedence over environmental concerns if environmental considerations are not included in the development review process.

*Economic Development*

Economic development attitudes and strategies within a community will have significant impacts on plan transformation. The potential for conflict between development objectives and sustainability objectives is considerable, and growth strategies expressed in the comprehensive plan are often at odds with concepts of sustainability. At the local level, too, the desire to attract employment and increase the tax base is often pursued with little or no consideration of the impact of the potential business beyond its perceived economic advantages. Major considerations to include in sustainable economic development objectives are: location of new business, type of business, land use and transportation impact, the ability of the business to participate in recycling programs, and air quality issues.

# CHAPTER 4: CASE STUDIES

In spite of the significant number and variety of barriers to sustainability, there is evidence that communities can and will move toward an integration of concepts of sustainable development into their plans and visions for the future. This chapter looks at how communities are integrating sustainability into planning efforts, in general, and transportation planning activities, specifically. The case studies focus on a variety of communities and approaches, including those that are responding to regional and state-level pressures for sustainable development. In response to the lack of sustainability in the College Station, Texas, Comprehensive Plan, the final case offers the recent success of a local grassroots organization, the Brazos Greenways Council, in developing and promoting a greenways plan for the city that was subsequently adopted for implementation and financing by the local City Council. This success serves as an illustration of the ability of local activists to focus attention and funding on sustainability in spite of traditional planning practices in their community.

**Cary, North Carolina, Land Use Plan**

In 1994, *Urban Land*, the trade journal of the Urban Land Institute, published an article about the urbanization of North and South Carolina (Martin 1994). The article focuses on the rapid development and growth occurring in the region, and the physical and perceptual shift from a rural to urban environment. With growth, however, came pressure to better plan development. Within this context, many of the smaller communities within larger metropolitan areas are experiencing changes in how they manage growth and provide public services. This section looks at one of these communities, Cary, North Carolina, and how its recent land use plan reflects many of the characteristics of sustainable development.

Situated in the center of North Carolina's Research Triangle, the town of Cary has grown from a town of three square miles with a population of 3,356 in 1960, to a community of 40 square

miles and a population of 76,800 in 1996. In 1996, the city adopted a revised Land Use Plan, prepared through a process of public participation and a 20-person Citizen's Advisory Committee, in addition to town staff. Among the plan goals and objectives are the following:

- Manage Cary's growth and development to maintain and enhance Cary's high quality of life. Specific objectives include encouraging and providing for mixed use development, encouraging small scale neighborhood-oriented commercial development, and encouraging pedestrian-oriented neighborhood design.
- Provide a comprehensive multi-modal transportation system for Cary. Objectives include pedestrian-oriented development and a comprehensive system of bike lanes, greenways, and sidewalks that connect all elements of the urban environment, and the proactive planning for transit development between Cary and other Research Triangle locations.
- Promote and sustain a progressive and positive planning process for Cary. Objectives include active participation in regional planning efforts and the equitable dispersion of infrastructure costs between the private and public sectors (Town of Cary 1996).

The introduction to the plan identifies seven important differences from previous planning efforts. Several of these are significant steps toward sustainability:

1. Stronger emphasis on urban design. The 1996 plan includes more guidance linking the plan vision to requirements.
2. The 1996 plan is more flexible than previous plans. The plan discourages strip development and promotes the village center concept for more pedestrian friendly, clustered development.
3. More attention to accessibility, rather than mobility. The plan encourages linkages between transportation modes, in order to make all areas of the town accessible.

4. Roadway design and landscaping receives greater attention than previously. The impact of roadway development on development, property values, community appearance, and livability is considered.
5. Natural resource preservation and protection is included in the plan, including specific guidance for wetlands, streams, forests, and water resources.
6. The plan supports "transit-friendly" development and cooperative transit planning with adjacent communities in the region.
7. Future economic growth is supported by the retention of prime employment areas for office and industry development (Town of Cary 1996).

The Cary Land Use Plan is a "policy" plan, rather than a physical plan or development ordinance. As such its purpose is to articulate the vision of the community as to how it wishes to grow in the future. The plan identifies four major ways in which it guides growth:

1. The Land Use Plan guides the application of the town's rezoning, annexation, subdivision, and site plan ordinances.
2. The Land Use Plan guides growth in Cary by guiding new town infrastructure and public investment.
3. The Land Use Plan guides growth in Cary through private sector and citizen reliance on the plan in making investment decisions.
4. The Land Use Plan guides growth in Cary through its recommendations for new ordinances, policies, and studies.

One of the contributing factors in revising the land use plan and in the concern over growth is the geographical limitations placed on Cary. Bounded by other municipalities, the Research Triangle Park, the Raleigh-Durham International Airport, and the Swift Creek Land Management Area (a watershed area which will be used to provide public drinking water to the area in the future), Cary has obvious constraints on where and how far it can develop. The planning area is finite,

yet at the time the plan was developed, there existed sufficient land to meet future needs. The concern was, however, that the available land would be properly managed to ensure "the long-term viability and sustainability of the community."

In order to address future growth and land demand in Cary, the plan developed a multiple scenario model. Two scenarios are included: a "Business as Usual" scenario, and a "Compact Development" Scenario. The Business as Usual scenario constructs future land demand based on current conditions and expected patterns of development. The Compact Development scenario integrate assumptions about changes in the anticipated character of growth, based on goals in the Land Use Plan. Future development assumptions under the Compact Development scenario include lower per capita land demand for commercial use, a decline in the percentage of low density housing (from 60 percent of all housing to 40 percent), and an increase in high density housing (from 23 percent at the present to 30 percent of future demand). Table 2 illustrates the land demand rations for the two scenarios.

**Table 2. Land Usage Demand per Capita (in acres per 1,000 pop.)**

| Land Use Category | Business as Usual Scenario (based on 1996 land use and population data) | Compact Development Scenario |
|---|---|---|
| Commercial | 10.47 | 8.37 |
| Industrial | 7.33 | 8.80 |
| Institutional | 11.49 | 11.49 |
| Lake, water bodies | 8.05 | 8.05 |
| Office | 9.47 | 11.36 |
| Park, open space, golf | 31.55 | 31.55 |
| Residential, high density | 9.44 | 10.04 |
| Residential, medium density | 19.30 | 26.77 |
| Residential, low density | 96.92 | 66.42 |
| Residential, very low density | 1.65 | 1.65 |

Source: Town of Cary, NC (1996)

The Cary Land Use Plan is developed around an "urban model" which links pieces of the community together to form the urban whole. Three main pieces—neighborhoods, communities, and regions—form the basis of the urban model. Neighborhoods are contiguous areas containing approximately 600 to 1,500 homes with 1,500 to 3,500 people, support first-tier public and private facilities, such as grocery stores, service stations, daycare centers and elementary schools, and are typically bounded by arterial roadways. Communities consist of three to five adjacent neighborhoods, and support second-tier public and private facilities, such as supermarkets, large discount stores, community parks, and upper level schools. The region contains the adjacent communities and can support third-tier facilities, such as regional shopping malls, major employment centers, and high schools or community colleges. Figure 1 illustrates the conceptual components of the urban model.

The urban model concept provides the rationale for the six major categories of land use found in the plan. These categories are:

- activity centers;
- office parks and industrial parks;
- nonresidential uses not found in the previous two categories;
- residential elements;
- parks, greenways, conservation corridors, and open spaces; and
- special opportunity sites.

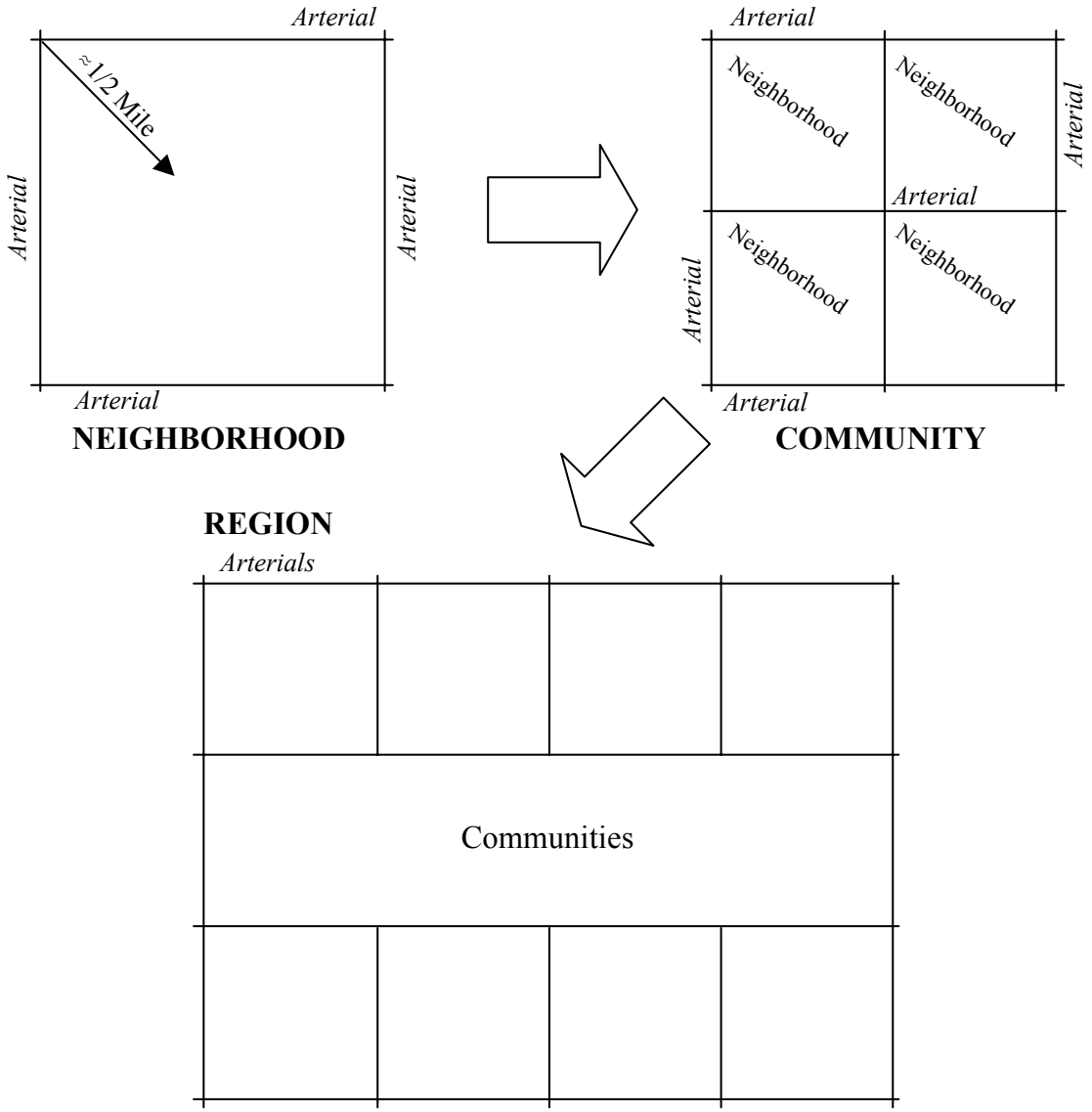



**Figure 1. Town of Cary: Urban Model**

The activity center land use category is the primary planning unit for the Land Use Plan and it includes several important attributes for transportation planning and sustainable transportation. The plan describes an activity center as consisting of a core focus area, where shopping, recreation, or other amenities are located surrounded by a support area from which the core draws its support. Figure 2 illustrates the concept of activity centers. The activity center concept is linked to the urban model in that the plan identifies three levels of activity centers: neighborhood, community, and regional. Activity centers, for example, suggest potential transit stop locations, as people will want access to or between these centers.

Residential land uses also include characteristics that will influence the integration of sustainable transportation concepts. While the plan relies on traditional suburban density categories (very low, low, medium, and high density) it also integrates the concept of "Traditional Neighborhood Development" (TND). The TND concept is based on pre-World War II style residential development that clusters dwelling around public spaces which encourages grid pattern development and more emphasis on non-automobile transportation modes. A comparison of residential category attributes is shown in Table 3. Some of the unique types of permitted development in a TND include a mix of housing units, such as single family detached and attached, and multifamily, the provision of neighborhood public outdoor spaces as neighborhood focal points, the allowance of some home-based businesses, and provisions for neighborhood institutional uses, such as daycare centers.

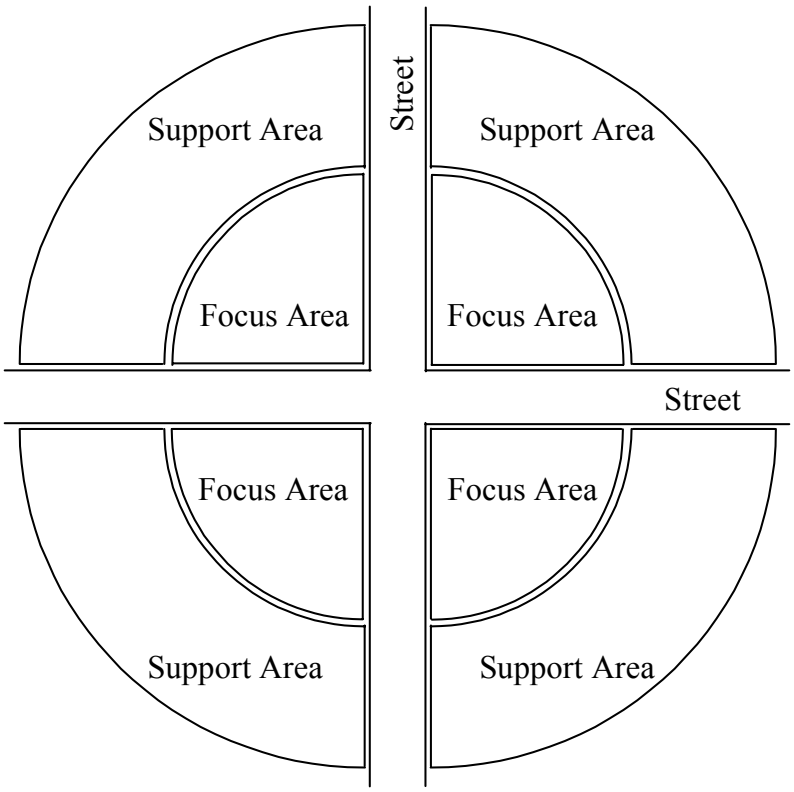



**Figure 2. Neighborhoods, communities, and regions are organized around focus areas. Focus areas include the commercial, office, and institutional core of an activity center. The surrounding support area includes residential uses, with higher densities nearest the focus area, transitioning outward into lower densities. (Town of Cary, North Carolina, 1996).**

**Table 3. Residential Category Attributes**

| Residential Category | Typical Housing Type | Lot Size Range (for single family attached and detached only) | Density Range (dwelling units / gross acre) |
|---|---|---|---|
| Very low density | Single family detached | 1 acre or larger | 1 or fewer d.u./ac. |
| Low density | Single family detached | 12,000 sq. ft. to 1 acre | 1 to 3 d.u./ac. |
| Medium density | Single family detached, townhouses, patio homes, duplexes, triplexes | *detached*: 6,000 to 12,000 sq. ft. *attached*: 3,000 to 6,000 sq. ft. | 3 to 8 d.u./ac. |
| High density | Townhouses, patio homes, duplexes, triplexes, apartments, condominiums | *single family attached*: 1,500 to 3,000 sq. ft./dwelling | *in activity centers*: neighborhood: 8-16 community: 12-25 regional: 16-30 *other*: 8 to 12 units/ac. |
| Traditional neighborhood development | All types | *Varies. Examples: detached*: 4,000 to 15,000 sq. ft. *attached*: 2,000 to 6,000 sq. ft. | *Varies. Examples: detached*: 3-8 units/ac. *attached*: 6-12 units/ac. *multifamily*: 12-20 units/ac. |

Source: Town of Cary (1996)

Finally, the plan is one of many steps that are being taken in the community to move closer to sustainability. The Town of Cary Transportation Plan is being revised to reflect the vision, goals, and objectives of the Land Use Plan. Development guidelines are also being developed to implement the land use plan, and coordination among public sector stakeholders in the community is being encouraged. The Town of Cary Land Use Plan recognizes and promotes an important factor in moving beyond traditional suburban development patterns and practices: human scale and pedestrian friendly design and development can be profitable. Attention to this detail can ultimately provide a greater quality of life in for the community.

**Cape Cod Regional Policy Plan**

In late 1996, the Barnstable County Assembly of Delegates and County Commissioners approved the Final Cape Cod Regional Policy Plan. The plan was developed by the Cape Cod Commission, a 19 member planning agency, comprised of representatives from the 15 towns in Barnstable County, the County Commissioners, minorities, Native Americans, and an appointee from the governor of Massachusetts. The regional commission was established in 1990 by an Act of the Massachusetts General Court and subsequently voted on favorably by county voters. Impetus for creation of the commission came from pressures derived from a growing population in the Cape Cod area, as well as a recognition of threats placed on the natural, coastal, historical, and cultural elements of the area from the increasing population. Several surveys of Cape Cod residents revealed a major concern over unplanned growth in the area and the negative impacts this type of growth would have on traffic, infrastructure, and quality of life (Cape Cod Commission 1999).

The Regional Policy Plan is "an expression of the shared aspirations of Cape Codders for the future," and one of its objectives is to "work toward the development of a sustainable regional economy." Recognizing that the Cape has a limited capacity for growth, the plan "seeks to articulate a collective vision, to define the essence of Cape Cod, to assure its distinctiveness, and to discover a way for us to inhabit and enjoy the Cape without turning it into merely another place (Cape Cod Commission 1996a). As a planning and regulatory document, the plan has the following objectives:

- Outline a coherent set of planning policies and objectives to guide development on the Cape and to protect its resources.
- Identify the Cape's critical resources and management needs.
- Establish a growth policy for the Cape.
- Set regional goals.

- Develop a policy for coordinating local, regional, and other planning activities (Cape Cod Commission 1996a).

The plan was developed through an extensive process of public participation and technical development by commission staff. It establishes review and regulatory policies to aid developers in conforming to the region's expectations, as well as providing a framework for the development of local comprehensive plans by the towns within the Cape area. Plan recommendations are ultimately implemented by the local planning committees of the individual communities.

The negative impacts of traffic and congestion were a significant contributor to the development of the plan. With a growth rate of 26 percent between 1980 and 1990, and an increase in housing units from 65,676 to 135,192 for the same period, the resulting growth in traffic problems inspired residents to rank traffic congestion as one of the most serious problems in the area. One of the unique elements of the plan and its processes is the development of methodologies for analyzing the growth capacity limits of the area. The growth capacity includes both natural and man-made components of the area, including transportation infrastructure. The growth policy for Cape Cod is based on three major principles:

- The rate of growth for any town shall not exceed the ability of the town to provide necessary services for the growth. This includes transportation infrastructure.
- The nature of growth shall not damage the natural or cultural character of the Cape.
- The amount of growth shall be sustainable, in that build-out levels of the area must be based on its carrying capacity and the vision of the community (Cape Cod Commission 1996b).

As an example of a community struggling with problems of growth and limited growth capacity, the transportation element of the Cape Cod Regional Policy Plan is instructive from a sustainability perspective. The goal of the transportation section is stated as follows:

> "To establish and maintain a multimodal transportation system on Cape Cod for present and future year-round and seasonal needs which is safe, convenient, accessible, effective, economical, and consistent with the Cape's historic, scenic, and natural resources and land use development and growth management policy" (Cape Cod Commission 1996c).

Performance standards included in the plan focus on ensuring that new development will not have negative impacts on the transportation system, and that other means, besides building new lanes, are used to increase capacity on existing roadways. These include travel demand management strategies and transportation systems management strategies. Further, the plan specifically states its desire to reduce the dependency on private automobiles and to encourage tourists and residents to use alternative modes of transportation (Cape Cod Commission 1996c).

The Commission has also instituted a concurrency stipulation in the plan. Transportation improvements that are necessary for project development "shall occur concurrently with the project development"(Cape Cod Commission 1996c). The use of concurrency clauses have been applied elsewhere, particularly in Florida. The purpose is to ensure that new development has adequate infrastructure in place at the time of development rather than later after development has occurred.

The Regional Policy Plan includes several implementation actions for carrying out its objectives. For example, the plan states that:

> "The Commission will work to expand the viability of bicycling and walking as modes of transportation."

Further, the Commission will:

> "Work to identify and expand sources of funding for transportation improvements that are consistent with the regional Policy plan" (Cape Cod Commission 1996c).

Finally:

> "The Commission will seek to enhance existing park and ride lots and to develop new ones in order to encourage the use of express buses for travel to off-Cape locations" (Cape Cod Commission 1996c).

The final section of the plan contains the regional coordination policy, as required by the Cape Cod Commission Act. In order to implement the objectives of the plan, the commission was aware of the problems that might occur considering the many agencies and stakeholders in developing and implementing policies such as those represented in the plan. Therefore, a coordination policy was required that would include local, state, and federal government agencies, and the private sector. The following is a list of those included in the regional coordination effort:

- local authorities, including local planning committees, planning boards, conservation commissions, Boards of Health, and related agencies or their representatives;
- county authorities including, County Commissioners, Barnstable County Health and Environmental Department, and the Cape Cod Economic Development Council.
- other regional authorities including, the Joint Transportation Committee, Solid Waste Advisory Committee, and the Coastal Resources Committee;
- state authorities, including the Governor's Committee, which coordinates various state-level executive departments and their agencies, the Massachusetts Historical Commission, the Executive Office of Communities and Development, the Department of Environmental Protection, and the Department of Environmental Management;
- the Massachusetts State Legislature, which was involved when the Commission encouraged amendment of the state zoning act to allow cluster development without a special permit, and when it sought help in developing legislation for the establishment of a regional land back that would help provide affordable housing on the Cape;

- the Coastal Zone Management program, which coordinates the development of state policy related to development, protection, and revitalization of coastal zone resources; and
- federal authorities, including the National Park Service (Cape Cod Commission 1996d).

In response to the considerable pressures applied to a desirable location, for tourists and residents alike, the commission has knitted together not only a viable plan for dealing with problems on a regional scale, but a framework for implementing the plan objectives that recognizes the importance of including all stakeholders in the process.

**Statewide Planning in Oregon**

From an innovative planning perspective, the state of Oregon has, perhaps, inspired more studies, evaluations, and praise than any other. Having over 25 years of success and experience with growth management attracts considerable attention, much of it focused on the Portland area and its history of growth management and land use practices. This section considers the Oregon planning experience from another perspective, however, by looking at the complex linkages between state-level planning goals and mandates and their impacts on county and city planning. The objective is to provide a glimpse at how the broad state goals with relevancy for sustainable transportation are developed, financed, and implemented at the lower levels. This is accomplished first with a brief overview of statewide planning in Oregon, followed by a summary of the Deschutes County land use and transportation plan, and the city of Bend land use and transportation planning experience.

*Statewide Planning in Oregon*

In 1973, the state Legislature passed the statewide land use planning law for Oregon. The law created the Land Conservation and Development Commission (LCDC), the primary state

planning agency, with a mission to statewide guide growth and development through statewide planning goals. The impetus for statewide planning came from unprecedented growth in the state and the loss of significant areas of beaches, farmland, and forests to development. The main tool Oregon has applied to control growth is the "urban growth boundary" required for every city in the state. In general, the purpose of the boundary is to confine development within the boundary while protecting farmland and forests outside the boundary (Benner 1998).

The statewide planning program emphasizes three major criteria: statewide goals are accomplished through local comprehensive planning efforts; these local plans must be in compliance with, and are reviewed by, the LCDC; and the statewide laws rely on coordination among special districts, state agencies, and the cities in order to ensure consistency. Providing the framework for statewide planning are 19 goals which outline land use policies. The 19 goals are as follows:

1. Citizen Involvement
2. Land Use Planning
3. Agricultural Lands
4. Forest Lands
5. Open Spaces, Scenic and Historic Areas, and Natural Resources
6. Air, Water, and Land Resources Quality
7. Areas Subject to Disasters and Hazards
8. Recreational Needs
9. Economic Development
10. Housing (Department of Land Conservation and Development 1996).
11. Public Facilities and Services
12. Transportation
13. Energy Conservation
14. Urbanization

15. Willamette River Greenway
16. Estuarine Resources
17. Coastal Shorelines
18. Beaches and Dunes
19. Ocean Resources

Several of the goals are relevant to sustainable transportation:

- Goal 2: Land Use Planning. The purpose of this goal is to "establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions." Plans developed within the state will conform to other, related plans such as city plans relating to regional plans. Plans shall also be based on facts and include data on natural resources, man-made infrastructure, economic and population characteristics, and roles and responsibilities of government units.
- Goal 9: Economic Development. Comprehensive plans are supposed to contribute to a "stable and healthy economy in all regions of the state." Planning guidelines for Goal 9 specify that attention be paid to the carrying capacity of the planning area, in terms of the impact of proposed development. "Planning directed toward diversification and improvement of the economy of the planning area should consider as a major determinant, the carrying capacity of the air, land, and water resources of the planning area." Carrying capacity of transportation infrastructure should be included this consideration.
- Goal 12: Transportation. The state goal for transportation is "to provide and encourage a safe, convenient, and economic transportation system. The goal also states that a transportation plan shall: consider all modes of transportation; consider differences in social consequences of utilizing different modes of transportation; avoid principal reliance upon any one mode; and minimize adverse social, economic,

and environmental impacts and costs. Transportation planning guidelines also link plans with a consideration for the carrying capacity of the planning area. Transportation plans are also required to be implemented in accordance with the comprehensive plan for the area.

- Goal 13: Energy Conservation. Goal 13 states: "Land and uses developed on the land shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles." Planning guidelines for Goal 13 also stipulate that land use planning should "seek to recycle and re-use vacant land and those uses which are not energy efficient." Land use planning should also encourage increasing densities along high-capacity transportation corridors to achieve greater energy efficiency.
- Goal 14: Urbanization. Goal 14 is "to provide for an orderly and efficient transition from rural to urban land use." Urban growth boundaries are to be established to "identify and separate urbanizable land from rural land." Again, the concept of carrying capacity is found in this goal, as it relates this rural-urban transition to the ability of the planned area to absorb any planned growth. Implementation guidelines state that "the type, design, phasing and location of major public transportation facilities and improvements thereto are factors which should be utilized to support urban expansion into urbanizable areas and restrict it from rural areas. This goal also suggests that financial incentives "should be provided to assist in maintaining the use and character of lands adjacent to urbanizable areas (Department of Land Conservation and Development 1996).

A summary of all 19 goals is found in Appendix A.

*Deschutes County Land Use and Transportation Planning*

Deschutes County, on the eastern side of the Cascade Mountains, is approximately midway between the Washington and California state borders and 160 miles southeast of Portland. Counties in Oregon are required, by the state law, to adopt comprehensive land use plans. Deschutes County recently developed a separate transportation plan from the three main cities in the county: Bend, Redmond, and Sisters. In 1979, the county developed a comprehensive plan that addressed the 1973 statewide planning legislation. In recent years, Deschutes County has seen tremendous growth. Currently, the population is estimated at 110,000, of which half reside in the incorporated cities. The County Planning Division of the Community Development Department is responsible for plan development and implementation, yet much of the work is undertaken in cooperation with the planning staff from the urbanized areas in the county (Deschutes County 1999).

In 1998, the county adopted a new Transportation System Plan. Drawing upon existing planning documents, such as the Deschutes County Comprehensive Plan, the Oregon Transportation Plan, and the local comprehensives plans for the urbanized areas, the Transportation System Plan (TSP) assumes a 20-year outlook for the county. The purpose of the TSP is to "develop a transportation system that meets the needs of the residents of Deschutes County, as well as regional and state needs. This plan addresses a balanced transportation system that includes automobiles, bicycle, rail, transit, air, pedestrian and pipelines. It reflects existing land use plans, policies and regulations that affect the transportation system and includes options to finance future projects" (Deschutes County 1998).

The primary concern of the 20-year plan is the anticipated build-out of available rural lots in the county as the population increases. Population of the county is expected to increase to 172,427 in the year 2016, with 46 percent of this population living in the incorporated cities in the county. Following a series of public forums, several issues were raised, particularly safety issues, but also

the issue of a lack of road width in the county for bicycle use. Of major concern is an expected shortfall in available funds for maintenance and new projects. The TSP projects a three-year shortfall (1998-2001) of over $8 million.

*The Bend Area General Plan*

Located within Deschutes County, Bend, Oregon, is the largest urban area east of the Cascade mountains. In 1995 the estimated population was 39,700. This is projected to increase to 68,700 by 2020. In 1994, the city of Bend decided to update its General Plan, which had not been significantly revised since 1981, with only a mandated periodic review in 1989. A 20-person advisory committee was established, which developed the following vision statement, for the city:

> "Bend is a community valuing its natural resources of trees, rocks, river, sounds, views, and a diverse citizenry that works together creating a healthy legacy and vision for Bend's future livability. The Bend Comprehensive Plan is designed to preserve and enhance this vision for our community" (City of Bend 1998).

The General Plan includes eight general goals, which provide guidance for growth:

- Neighborhoods: Create and preserve attractive neighborhoods for living.
- Natural Beauty and Heritage: Protect and enhance Bend's natural beauty noting especially the trees, rocks, rivers, view, sounds, and historic structures.
- Appearance of Structures: Ensure that the "built environment" is as attractive as feasible.
- Quality Economic Growth: Assure an opportunity for a stable, vital, and diverse economy while sustaining its environment/ecological support systems.
- Diversity of Quality Living Options: Assure the opportunity for a wide variety of housing and neighborhoods within a community divers in education, income, employment, and recreation opportunities.

- Transportation Options Appropriate to Bend: Foster transportation systems that provide opportunities for all practical modes to facilitate the livability of neighborhoods and the community.
- Public/Civic Involvement: Encourage involvement by all citizens, corporate and individual, to keep the city vital and the plan an "evolving vision."
- Implementing Consistent Ordinances: Implement the plan through effective, clear, and consistent ordinances and language that reflect the intent of the vision (City of Bend 1998).

The transportation component of the General Plan is intended to assure that "safety, accessibility and mobility will be provided for all users." The transportation goals are as follows:

- Mobility and Balance: Develop a system that uses all modes and reduces reliance on the car.
- Efficiency: Address congestion through analysis of all possible alternative solutions; encourage land use development patterns that encourage a reduction in number and length of trips.
- Accessibility and Equity: Provide travel and access options across all income levels.
- Environmental: Recognize and respect the natural environment when implementing transportation improvements; design with preservation and conservation in mind.
- Economic: Implement transportation improvements to foster economic development.
- Livability: Protect the livability of the community when designing and locating transportation improvements
- Safety: Design and construct a safe transportation system for all modes (City of Bend 1998).

The Bend General Area Plan transportation element is designed to meet the state LCDC statewide goals and statutes. The Plan projects modest increases in the use of alternative travel

modes during the 20-year planning period. These increases are being attributed to: 1) improving the bike and pedestrian conditions (completion of 68 miles of bike lanes) and implementation of a transit system; 2) Land use changes, particularly the development of a mixed use river front zone; and 3) changes in driving behavior (City of Bend 1998).

Opportunities for improving the conditions for pedestrian and cycling use in Bend are positive. A population interested in healthy lifestyles and outdoor activities, and the small size and flat terrain of Bend, contribute to this outlook. A system of multi-use trails and bike trails has been developed in Bend, which provides residents with a network for recreation and for commuting. Although the city does not currently have a fixed route transit system, several feasibility studies have been conducted which supports its development in the future as the population increases within the urban growth boundary (City of Bend 1998).

Financing the General Plan's transportation system comes from public funds and private funds, through land development and subsequent transportation improvements. In regard to transportation finance, the plan's policies area as follows:

1. The city, county, and state shall work together to develop new sources of transportation funding for all transportation modes.
2. The selection of transportation improvements, within the city's yearly Capital Improvement Program plan, shall be subject to public review and comment through a City Council public hearing process.
3. The city shall recognize the need for a balanced transportation system in developing the transportation capital improvement program.
4. The city shall explore ways in which to better inform and involve citizens in the development of transportation system budgets.
5. The city should consider taking steps to utilize transportation system development charges (SDCs) for the full range of road capacity improvements, including:

transportation demand management, trails, transit, sidewalks, and bike lanes (City of Bend 1998).

*Summary*

This section briefly outlines a complex system of state-county-local land use and transportation relationships that result in a set of interrelated and coordinated plans and policies. Oregon is unique in its approach to planning and is often cited in literature reviews and "best practice" reviews. Rarely is the complexity of the statewide planning endeavor considered, however, as it is here. The level of coordination between planning jurisdictions must be complimentary and consistent in order for such a system to be effective. While other states do not have statewide planning in place at this time, it is instructive to consider the Oregon approach as it does provide a model for cooperation and coordination of planning efforts that can be applied between most planning agencies, jurisdictions, and stakeholders.

**Sustainability in Canada and the Vancouver CityPlan**

Canada has been in the forefront of sustainable development and sustainable transportation practices. Eighty percent of its 27 million inhabitants live in urban areas, with 9 million in the Toronto, Montreal, and Vancouver areas. With a small population and a large land area, Canada has developed into a country with large lot single family houses, cheap gasoline, and a reliance on the automobile as the primary mode of transportation (Duncan and Hartman 1996). This section considers some of the general, nationwide efforts at dealing with these characteristics and then focuses on the city of Vancouver, British Columbia, and its recent 30-year approach to planning a neighborhood-oriented city.

*Sustainability in Canada*

In 1993, the Transportation Association of Canada published "A New Vision for Urban Transportation." This brief document has had a profound impact on transportation planning and

decision making in Canada and has been endorsed and accepted by many local, provincial, and national organizations and communities. The basis of "A New Vision" is a generic transportation vision that can be tailored and applied in medium or large cities and that supports a move to more socially desirable, environmentally friendly, and economically competitive cities in the future. This vision is articulated in 13 basic decision-making principles that are designed to help communities develop, finance, and implement sustainable transportation alternatives:

1. Plan for increased densities and more mixed land use.
2. Promote walking as the preferred mode for person trips.
3. Increase opportunities for cycling as an optional mode of travel.
4. Provide higher quality transit service to increase its attractiveness relative to the private auto.
5. Create an environment in which automobiles can play a more balanced role.
6. Plan parking supply and price to be in balance with walking, cycling, transit, and auto priorities.
7. Improve the efficiency of the urban goods distributions system.
8. Promote inter-modal and inter-line connections.
9. Promote new technologies which improve urban mobility and help protect the environment.
10. Optimize the use of existing transportation systems to move people and goods.
11. Design and operate transportation systems which can be used by the physically challenged.
12. Ensure that urban transportation decisions protect and enhance the environment.
13. Create better ways to pay for future urban transportation systems (Transportation Association of Canada 1993).

The complete text of "A New Vision" is included in Appendix B.

Other Canadian agencies have focused on the issue of sustainable transportation. Recently, the National Round Table on the Environment and the Economy formed a Program on Sustainable Transport, with the purpose of advising Canadians on issues of environment, transport, and sustainability. Formation of this task force was spurred on by the awareness and concern of the un-sustainability of current Canadian transportation patterns and practices. The impact of air pollution from transportation sources was identified as being a major contributor in Canada to health problems and to the increasing concentration of greenhouse gases in the environment. Several trends were equally disturbing, including the expected growth in vehicles and miles traveled, the increase in the size of vehicles, particularly light-duty trucks, and the decline in fuel prices. Other contributors to unsustainable transportation in Canada include land use decisions that encourage sprawl, users paying less than full costs of transportation infrastructure development, and the division of power for transportation decision making among multiple levels of government (National Round Table on the Environment and the Economy 1997).

The task force arrived at three critical modes, three critical targets, and three critical challenges with which to focus efforts at solving the unsustainable transport problem in Canada:

- Critical Modes. These modes contribute the most to unsustainability:
  urban transportation
  intercity freight
  air transportation
- Critical Targets. These are the goals to pursue in order to achieve sustainable transportation:
  reduce the need for motorized travel
  reduce consumption of energy per unit of transportation
  reduce emissions per unit of energy consumed
- Critical Challenges. These are three strategies to move toward sustainable transportation:

raise public awareness

coordinate government action

ensure that price signals encourage sustainable transportation (National Round Table on the Environment and the Economy 1997).

Three sets of recommendations are included in the report of the Task Force. These action areas and specific recommendations for each are listed below:

1. Implement Programs of Education and Awareness.
    a. Implement a national awareness program on risks of status quo and necessary changes for sustainability.
    b. Create and implement education programs on sustainable transportation for primary grades to university.
    c. Create and support sustainable transportation awareness programs among local grassroots organizations and national professional organizations.
2. Government Coordination.
    a. Build consensus, vision, and principles for national-level strategies of sustainable transportation.
    b. Create national strategies for greenhouse gas emission reduction, and integration of transportation into the National Action Program on Climate Change.
    c. Encourage greenhouse gas emission reduction targets, adoption of sustainable transportation plans in municipalities, and progress reports from large cities on the implementation of the Transportation Association of Canada's "New Vision for Urban Transportation."
3. Reduce the Environmental Impacts of Transportation.
    a. Lead analysis and debate on the use of economic instruments for moving toward sustainable transportation.

b. Support more data collection and analysis for full-cost accounting and user-pay principles.
c. Ensure that land use policy and legislation in the provinces support the "New Vision for Urban Transportation."
d. Implement vehicle emission inspection and maintenance programs in all provinces (National Round Table on the Environment and the Economy 1997).

Finally, the national transportation agency, Transport Canada, is also involved with sustainable transportation. In its "Sustainable Development Strategy" (1997) it focuses on two related environments: the overall transport sector in the country and its own internal operations. The first perspective relates to the role that Transport Canada has in the national context and how it can promote and encourage more sustainable transport initiatives. The second perspective relates to how it does business and how its ensures environmentally sound practices. It has developed an eight-step action plan that addresses the major challenges confronting the national transportation agency. Table 4 summarizes the action plan.

*The Vancouver CityPlan*

In the late 1960s, the city of Vancouver, British Columbia, decided not to allow the construction of freeways in the city, making it the only major Canadian city without freeways. This decision has lead to unique perspective on city planning, in general, and transportation planning, in particular. Transportation is seen as a "means to a better city, rather than as a goal in itself." (City of Vancouver 1997). This section reviews two important planning activities in Vancouver and their subsequent planning documents: *CityPlan: Directions for Vancouver* and *The City of Vancouver Transportation Plan*.

## Table 4. Transport Canada's Sustainable Development Section Plan

| Strategic challenge | Within its own mandate, Transport Canada plans to: | In partnership with others, Transport Canada will: |
|---|---|---|
| Minimize the risk of environmental damage from transportation accidents<br>  | ▸ continue present efforts to minimize the frequency of and the environmental damage from accidents through regulatory and promotional activities;<br>▸ ensure that all aspects of ongoing safety management activities include environmental considerations;<br>▸ examine the feasibility of reducing both penalties and ship inspection fees for ships with "green operations;"<br>▸ continue to administer the mandatory Emergency Response Assistance Program (ERAP) required of shippers of special dangerous goods to promote safety of the environment;<br>▸ ensure that industry response to accidents involving dangerous goods is appropriate by continuing to have Transportation of Dangerous Goods (TDG) inspectors attend the accident scenes; and<br>▸ continue to operate CANUTEC, the 24-hour Canadian transportation emergency centre (the "U" stands for urgence). The centre provides emergency-response information to people responding to the accidental releases of dangerous goods. | ▸ continue to administer the *Transportation of Dangerous Goods Act, 1992*, including associated agreements with the provinces and territories;<br>▸ develop an improved database on accidents with environmental hazardous substances, as well as routing and other exposure data;<br>▸ pursue full implementation of the National Safety Code for Motor Carriers;<br>▸ work with carrier and shipper associations to promote the use of published safety ratings for companies and set up carrier recognition programs;<br>▸ ensure an integrated and coordinated approach by the department's Marine Safety Directorate and the Canadian Coast Guard for marine pollution prevention and emergency response; and<br>▸ ensure that the Arctic dimension of marine pollution prevention administered by Transport Canada under the *Arctic Waters Pollution Prevention Act* is linked with the Arctic sustainable development initiatives of the Department of Indian Affairs and Northern Development and international initiatives under the mandate of the Arctic Council. |

## Table 4. Transport Canada's Sustainable Development Section Plan, continued

| | | |
|---|---|---|
| Promote greening of  operations in the transportation sector | ▸ develop and implement its own Environmental Management System (EMS) according to ISO 14000 principles. Objectives and targets focus on the areas of resource use, land management, waste management, hazardous materials/dangerous goods, water and emergency response. | ▸ work with other federal departments that have related programs, including Natural Resources Canada's efforts to promote fuel efficiency in the road sector, and Industry Canada's initiatives on life-cycle analysis and eco-efficiency;<br>▸ refine techniques for pollution prevention, site remediation, waste management and environmental assessment;<br>▸ work with carriers and shippers to explore tools such as life-cycle management and eco-efficiency for use in the transportation industry; and<br>▸ work with the transportation industry to develop and disseminate analytical tools, best practices, and information for better environmental management. |
| Reduce air emissions from transportation sources | ▸ reduce air pollution by exercising its motor vehicle, aviation, and marine emissions mandate vigorously; and<br>▸ reduce the transportation sector's contribution to climate change by exercising the department's responsibilities for policy, regulation, and technological development. | ▸ develop a national strategy for transportation and climate change, which will address Canada's related international commitments;<br>▸ work with key federal departments, provincial/territorial transportation departments, municipalities, and other transportation stakeholders to seek a broad-based consensus on effective initiatives to reduce greenhouse gas emissions from transportation sources;<br>▸ work with provincial/territorial and municipal governments, as well as environmental organizations, to promote market-based and consumer/volunteer-based approaches to achieve emissions reductions; and<br>▸ work as part of the National Air Issues Coordinating Committee with other departments and the provinces/territories to develop coordinated initiatives, such as smog management plans to reduce air pollutants. |

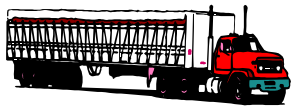
## Table 4. Transport Canada's Sustainable Development Section Plan, continued

| | | |
|---|---|---|
| Promote education and awareness on sustainable transportation<br>  | ▸ lead and contribute to stakeholder consensus-building on the construction and achievement of a common definition, vision and principles of sustainable transportation, linked to the ongoing efforts of the National Round Table on the Environment and the Economy, the Centre for Sustainable Transportation, and the Transportation Association of Canada; and<br>▸ prepare a synthesis of education and awareness approaches and techniques, and their cost-effectiveness. | ▸ work with other government departments, the provinces/territories, and municipalities to help promote education and awareness programs that contribute to the department's goal of sustainable transportation, such as Health Canada's efforts to promote cycling and walking, and municipal planners' efforts to promote public transit;<br>▸ determine the necessary awareness initiatives in cooperation with other government departments, the National Round Table on the Environment and the Economy, the Centre for Sustainable Transportation (for example, work on primary and post-secondary school and professional association promotion programs), the Transportation Association of Canada and environmental organizations, such as Pollution Probe, Friends of the Earth, the Green Communities Association, Transport 2000, Transportation Options, and the Green Tourism Association;<br>▸ work with international and domestic environmental and transportation organizations to build awareness of, develop and promote innovative solutions toward sustainable transportation; for example, employer sponsored van pools, cooperative car pools, employer trip reduction programs; and<br>▸ participate in international organizations' work to promote education and awareness on sustainable transportation. |
| Assess the department's direct budgetary transfers for their environmental impact | ▸ fully implement the process of strategic environmental assessment for any new program proposal involving direct budgetary transfers. | ▸ work with Finance Canada, Environment Canada, National Resources Canada, and other federal departments to develop a common approach to assessing barriers and disincentives to sound environmental practice arising from budgetary transfers; and<br>▸ work with the Canadian Environmental Assessment Agency and others to promote and apply environmental assessment to policy and program proposals. |

## Table 4. Transport Canada's Sustainable Development Section Plan, continued

| | | |
|---|---|---|
| Refine sustainable transportation performance indicators | ▸ continue to include the best available data on the environmental impacts of transportation in the department's annual report;<br>▸ develop a set of quantified environmental performance indicators and supporting data, which will be targeted for the year 2005; and<br>▸ use the indicators to report on environmental trends in transportation, aid decision making, track actions, and help integrate environment with safety and efficiency. | ▸ work with Environment Canada on air pollution and greenhouse gas indicators and with Natural Resources Canada on fuel consumption indicators;<br>▸ work with the Organization for Economic Co-operation and Development, the Centre for Sustainable Transportation, and the Transportation Association of Canada to review approaches to developing environmental indicators for transportation in the Canadian context; and<br>▸ once an approach has been selected, work with these organizations and the transportation industry to develop: a set of objectives for each transportation mode; an accepted set of up to 25 national indicators related to the objectives; and a process for continuous improvement in gathering the supporting data for transportation's environmental indicators. |
| Understand the environmental costs of transportation | ▸ analyze and determine the department's position on charging environmental costs to the various modes by April 1, 1999. This undertaking will include consideration of alternative approaches, the modes' existing financial burden, the strategic need for provision of infrastructure as well as the impact on the transportation sector and on urban and rural accessibility. | ▸ work with the National Round Table on the Environment and the Economy, the Department of Finance, and other stakeholders to assess the impact on the transportation sector of proposals aimed at managing transportation demand through use of economic instruments;<br>▸ work with organizations such as the Transportation Association of Canada and the Organization for Economic Co-operation and Development to put together national and international perspectives on the impacts of transportation and environmental costs;<br>▸ work with the transportation industry to assess impacts of full-cost accounting on prices and services; and<br>▸ work with urban interest groups to develop transportation investment and planning approaches that incorporate sustainability considerations such as long-term environmental and land use costs. |

**Table 4. Transport Canada's Sustainable Development Section Plan, continued**

| | | |
|---|---|---|
| Develop and promote the application of cleaner transportation systems and technologies | ▸ continue to be a focal point for technological development and core research and development to support safety regulation and policy development;<br>▸ gather and disseminate information on specific technologies that reduce the environmental impact of transportation, such as the use of alternative fuels; and<br>▸ ensure that the department's regulatory activities are not an undue obstacle to applying new technology but rather promote new technologies and new applications of existing technologies, such as electric propulsion. | ▸ seek the best niches in which to develop technologies for international use, such as intelligent transportation systems and advanced fuel cells.<br>  |

In 1992, the Vancouver City Council decided that the city should prepare a plan, through an extensive process of public participation, that would reflect "a shared vision for the future of Vancouver." The public participation process involved over 20,000 people providing ideas, direction, and attending meetings. Through this process, *CityPlan* was developed and adopted in 1995. Its vision is stated simply:

> "Vancouver residents have created a CityPlan that will lead to a city of neighborhoods; a city where there is a sense of community for all ages and cultures; a city with a healthy economy and environment; and a city where people have a say in the decisions that affect their neighborhoods and their lives" (City of Vancouver 1995).

As in the land use plan developed by the town of Cary, North Carolina, Vancouver uses the neighborhood as a building block. According to *CityPlan,* "Vancouverites want a city of neighborhoods," and that each neighborhood should have its own identify. Within each neighborhood, residents should be able to have various needs met at a neighborhood center, which would include shopping, services, public spaces, all intended to impart a feeling of community.

As there are no freeways in Vancouver, neighborhood traffic can be a problem as drivers pass through neighborhoods to their destinations. In order to control this type of traffic, the neighborhood concept relies on traffic calming and by placing the emphasis on alternative modes of transportation. Neighborhood centers can reduce the need to drive in certain areas.

Transportation plays a significant role in each of the main components of the vision statement. For example, under "City of Neighborhoods," one of the directions is to provide for public spaces where people can walk and which link the center with the rest of the neighborhood. Each center should also be linked to the downtown area by both transit and greenway development.

The goal of having new and more diverse public places in the neighborhoods also stresses the importance of greenway development for bicycle and pedestrian traffic.

The "Healthy Economy—Healthy Environment" section focuses on providing more jobs in the neighborhood centers. One impact of this strategy will be to reduce the number of automobiles in neighborhoods so residents can walk or bike to work. In order to achieve this goal, *CityPlan* states that Vancouver will:

- Increase transit use within and into the city.
- Provide better bicycle and pedestrian connections.
- Increase parking rates, tolls, and taxes in order to discourage automobile driving.
- Make better use of existing streets for alternative transportation modes.
- Encourage changes in land use that will support downtown residential developments, provide for jobs in neighborhood centers, and reduce neighborhood traffic (City of Vancouver 1995).

The plan also recognizes significant barriers to carrying out this section of the plan, in particular the problems associated with multiple levels of governance involved in transportation decision making. For example, most transit decisions are made at the province level not at the city level. This creates obvious problems of coordination and planning cooperation. CityPlan was also developed under the shadow of a larger plan, the Greater Vancouver Regional District's Livable Region Strategic Plan, which was approved in 1994. Transportation directions found in the regional plan are generally supported by *CityPlan*, including development of two new transit lines. Implementing both the regional and the city plan will require significant cooperation between the province and city levels.

Finally, one unique aspect of CityPlan is its attention to financing the changes necessary to achieve the vision as articulated by the residents of the city. Participants expressed a desire for

more accountability from the city in regard to how tax revenue was being spent, and that revenues should be redirected toward implementing CityPlan objectives. In particular, residents were agreeable to considering increases in automobile fees (gas taxes, tolls, and registrations) to fund transit improvements.

One of the "next steps" found in *CityPlan* directs the city to develop a transportation plan that would integrate the vision of *CityPlan*. In 1997, the Vancouver Transportation Plan was approved by the City Council. The major intent of the plan is to implement the transportation direction articulated in *CityPlan*. The plan contains key principles, key targets, and key elements. Key principles of the Transportation Plan include:

1. Encouraging residents to rely less on the automobile and more on sustainable modes of transportation.
2. Support for limited road expansion and more emphasis on transport demand measures.
3. Transportation demand growth will be supported through improving alternatives to the car, such as transit and bicycling.
4. Overall road capacity will not increase.
5. The car will continue to be the primary mode of transportation in areas where alternatives do not exist.
6. Traffic calming will be implemented in order to reduce vehicle short-cutting and to reduce traffic speeds in neighborhoods.
7. Existing truck networks will be maintained, and improvements of access to the Port will be pursued.
8. Planning and development policies will support local shopping and businesses in order to provide more services to neighborhood residents.

Transportation Plan Targets for the year 2021 focus on the shift from automobile use to transit. Travel to the downtown area targets include:

1. 44 percent of residents are expected to use transit by 2021 (representing an increase from 32,000 to 52,000 from 1996 levels).
2. 14 percent of people are expected to walk or cycle (3 percent increase over 1992 levels).
3. 42 percent of people arriving downtown are expected to use cars (representing a constant rate from 1992 levels).

The Transportation Plan also includes six key elements:

1. *Sharing the road network*. This includes allocating more road space to transit, improving truck access, allocating space for cyclists, and improving pedestrian comfort and safety.
2. *Calmer traffic in neighborhoods*. This element focuses on neighborhood traffic problems and traffic calming solutions.
3. *Better transportation balance downtown*. Transit improvements in order to keep up with the projected increases in downtown employment are recommended, without an increase in road capacity.
4. *Targets for transportation*. These are summarized in the previous section.
5. *Priorities for implementation*. Transit improvements are the highest priority.
6. *Paying for transportation*. Vancouver residents do not want tax increases, so funding for plan implementation will come from the re-direction of existing funds, and in cost-effective transit investments at the province level (City of Vancouver 1997).

A unique quality in the Vancouver Transportation Plan is its recognition of the need to change personal attitudes and behaviors. Incentives to reduce automobile use can only do so much,

according to the plan, and how individuals choose to react to those incentives is a critical factor in the success or failure of moving toward a more sustainable community:

> "Choosing to shop locally, walking or cycling children to school, using the bus to get to work, combining trips when we do use the car, driving slowly on residential streets, avoiding short cuts through neighborhoods, are examples of how individuals can help to reduce traffic impacts and reliance on the car. Transportation debates in the city have often been characterized by people's objection to traffic in their own neighborhoods, but insistence on their rights to drive with the greatest convenience through other people's neighborhoods. The success of the Plan will hinge on personal commitment, and willingness to accept some extra inconvenience when traveling around the city" (City of Vancouver 1997).

**Schools and Sustainable Transportation: Toronto's Greenest City Project**

An excellent example of how one community has implemented national-level recommendations for sustainable transport at the local level can be seen in Toronto, Canada. A grassroots organization established in 1995, the Greenest City project in Toronto, Ontario, brings together a diverse set of community organizations, each with specific project foci, yet recognizing the need for coordinated efforts in promoting a livable city. In 1997, the organization became an independent program, focusing on two main programs: the Multicultural Greening Project and the Active and Safe Routes to School project (Greenest City 1999).

Greenest City illustrates the linkage between problems of unsustainable transportation and schools. Several programs sponsored by the organization provide illustrations of how to direct attention to the significant impact transportation issues have in getting children to and from schools everyday. Greenest City actively supports sustainable transportation alternatives for school children. Their Active and Safe Routes to School Project is based on a Danish program established in 1976 which was developed in response to the rising number of children killed by

automobiles. In an effort to make streets safer, communities around the world have adopted this program which relies on the support from teachers and school administrators, local businesses, and politicians, as well as parents and students.

The focus on school age children and transportation is based on concern for safety, health, and the environment. Safety concern is attributed to the dramatic decline of school age children being allowed to walk to school unattended, which is partly attributed to parental worry over automobile traffic around schools. The concern over health focuses on the increase in the inactive lifestyle among children. Walking to school is seen as a positive step toward greater physical health and well-being. Finally, concern over the environment recognizes the negative contribution of short automobile trips, such as those used from dropping off and picking up children at school. Greenest City promotes alternative transportation modes for children as a means for addressing these concerns.

The Active and Safe Routes to School project includes five related components:

- Walking School Buses. This program is aimed at those students living within walking distance to schools. The objective is to find parents and volunteers in the community that will escort groups of students back and forth from school, thus reducing the number of automobiles in the school area. The Walking School Bus concept makes streets safer, encourages walking as a mode of transportation, and reduces school-area pollution from automobiles.
- Blazing Trails Through the Urban Jungle. This educational program introduces children to mapping and teaches them about their neighborhood from a walking perspective. The curriculum focuses on sustainable transportation, geography, and safety.
- Remember the Rule: No Idling at School. This program encourages drivers to turn off engines as they wait in school zones for their children. The tendency to idle while

waiting contributes to peak air pollution levels in the vicinity of schools while motorists wait.

- Neighborhood Walkabouts. Walkabouts are community involvement activities that strive to bring communities together to discuss transportation problems and solutions and identify possible partnerships for solving these problems.
- Walk a Child to School Day. Greenest City supports and promotes an annual event geared toward encouraging more students to walk to school. The organization distributes brochures and registration packages and accepts donations from local businesses for awards, prizes, and snack items for walkers.

Funding and support for these programs come from a variety of sources, including the Toronto District School Board, the Toronto Atmospheric Fund, Health Canada, the Toronto Police Traffic Services Division, and the City of Toronto (Greenest City 1999).

The focus on children and schools serves multiple purposes for Greenest City. First, the educational nature of the programs seeks to encourages children to become aware of environmental problems and active in community-level solutions. Second, by focusing on health, safety, and environmental concerns, a diverse set of issues are linked to sustainable transportation alternatives as one possible solution that can be addressed at the local level.

**The Brazos Greenways Council**

The Brazos Greenways Council (BGC) is a non-profit, volunteer organization in Bryan/College Station, Texas, home of Texas A&M University. The objective of the BGC is to:

> "establish and maintain a network of greenways and open spaces to enhance recreational, environmental, transportation, cultural, and economic values in the Brazos County area" (Brazos Greenways Council 1999).

Over the past three years, the BGC has been successful in raising awareness of greenways issues in the community, representing and advocating environmental interests in the community, and in influencing public policy related to sustainable development. Transportation, in particular, is of primary importance to the group as they see greenways as a way to link the community for people, through the development of bike and pedestrian trails, and for wildlife, through the availability of continuous green spaces. Most recently, BGC members participated in the College Station Greenways Implementation Task Force, which was successful in developing and implementing a citywide greenways plan, which has been approved by the College Station city council. In the fall of 1999, the BGC has also secured a $27,000 grant from a National Park Service grant program which will be used to fund a Community-Based Visioning effort in the Brazos County. In spite of the recent success of the organization, the issue of local greenways was not always a high priority agenda item in the community. This section outlines the brief history of the BGC, its strategies, and its objectives for the future (Shafer 1999).

Initial interest in community-level action was spurred by several graduate students who were interested in bird watching and had positive experiences with local environmental efforts in other communities before coming to the Brazos Valley. These individuals brought together others from local chapters of the Sierra Club and the Audubon Society, as well as local cycling and mountain biking clubs, and academics from Texas A&M University. The timing of the initial meetings of these individuals coincided with two significant events in the community: the updating of the College Station comprehensive plan (as described in the previous section), and the proposed development of the Carter Creek area east of College Station, that was considered by many to be potentially detrimental to the local environment and floodplain.

The reaction of the BGC regarding the College Station comprehensive plan, which had been made available to the community in draft format, was that although references were made to greenway development and preservation, it lacked specifics and needed "beefing up." Members

of the BGC took the opportunity at public hearings on the comprehensive plan to advocate for additional emphasis on greenways. During the draft revision process, the BGC's strategy was to influence the planning process, advocate for greenway development and preservation, and expand the public input into the planning process. The BGC also decided to maintain a positive perspective on the draft comprehensive plan at this time, too, rather than assume an adversarial position in the process. It was decided to identify the positive elements within the plan and to perceive the draft plan as a starting point on which to build and enhance the existing greenways-related components, rather than a flawed document in need of total revision.

The efforts of the BGC encouraged them to seek outside support and funding with which to continue their advocacy and educational efforts. The Austin, Texas, office of the National Parks Service (NPS) was targeted as a partner. The outreach arm of the NPS, the Rivers, Trails, and Conservation Assistance (RTCA) program provided technical assistance for organizational development, meeting facilitation, and for identification of potential grants and funding opportunities (Brazos Greenways Council 1999). The RTCA provided facilitators for meetings between potential developers of the Carter Creek area and the BGC.

Group activities to contribute to the comprehensive plan revision carried over to the five-year capital improvements planning (CIP) process in College Station. Several members of BGC were appointed to the 25 member citizens advisory council that was charged with prioritizing capital spending targets for the next five years. The BGC was invited to present their initial greenways plan during the CIP process, which effectively raised the level of awareness of advisory council members to the greenways issue and contributed to the inclusion of greenways funding in a subsequent successful bond election.

Several factors can be identified as contributing to the success of the BGC. First, the coincidence of increased interest in environmental issues in the community with the revision of the

comprehensive plan provided an appropriate vehicle for advocates to become involved and raise the issue of greenways in the community. Second, the ability of the group to attract members within the community and from state and national organizations strengthened the position of the group as well as provided additional resources for its efforts. The coalition of recreational, environmental, and academic interests remains one of the BGC's strongest attributes.

Shafer states that part of the success of the BGC can also be attributed to the fact that the issues and values expressed by the group were mirrored by many among the city planning staff and elected officials at the time. While planning staff, in general, may be hesitant or unwilling to express environmental values, they may be willing to provide access for environmental groups and provide forums and venues for such groups to discuss and advocate for these issues. This appears to be the case in this example, as city staff encouraged participation by BGC members in various meetings and venues, such as the comprehensive planning and CIP processes.

The future of the BGC is one of aggressive and expansive advocacy for greenways issues. They anticipate becoming more involved in greenways planning in Bryan, College Station's sister city to the north, which is initiating its own comprehensive plan revision process. They also see a continuing role in educating elected officials in the community, as new ones are elected or appointed. The BGC has also targeted another critical area within College Station, Wolf Pen Creek, that is undergoing development pressure (Shafer 1999).

In response to the lack of sustainability in the College Station, Texas, comprehensive plan reviewed in the previous chapter, the final section offers the recent success of a local grassroots organization, the Brazos Greenways Council, in developing and promoting a greenways plan for the city that was subsequently adopted for implementation and financing by the local City Council. This success serves as an illustration of the ability of local activists to focus attention and funding on sustainability in spite of traditional planning practices in their community.

**Discussion of Cases**

The previous cases illustrate the wide range of planning contexts and approaches that must be considered in an assessment of the concept of sustainability. Some contexts have national and state, or provincial, ramifications, while others are more localized. Some approaches to sustainability are broad and represent major movements toward a more sustainable future, while others are more incremental and narrowly defined. This final section provides some general observations from the case studies as they pertain to developing and implementing sustainable transportation alternatives:

- *Scale is important*. Where, in the complex sphere of governmental jurisdictions, is the planning effort taking place? Is the effort local, regional, or being conducted at a higher level of government? Scale contributes to support and funding opportunities.
- *Transportation problems are intricately linked to other problems of sustainability*. One way to address this situation is by starting with a broad brush and working to the specific. The Town of Cary, North Carolina, developed its land use plan first and the vision for what the community wants to look like, for example. This provides the framework for later developing the transportation plan. Through this sequencing of plans, the community can plan its transportation actions around the vision, rather than letting transportation drive the process, as it were.
- *Advocates are important*. The Toronto Greenest City and the Brazos Greenways Council examples illustrate the importance of local advocates for sustainable transportation options. Without people willing to assume responsibility and take action to support their beliefs, many sustainability initiatives may never move forward.
- *Coordination and cooperation are important*. In a state with statewide planning, such as Oregon, the coordination of plans and actions must be coordinated. This situation encourages thinking beyond one location and in recognizing the impacts that single

communities can have on the larger environment. Cooperation among planning institutions, too, is important as illustrated by the Vancouver case.

- *Communities can change*. The Town of Cary Land Use Plan shows a community in transition, from a typical suburb to one that is attempting to integrate concepts of sustainability through land use and design guidelines. Change may not be easy or swift, but it can be encouraged and supported.

# CHAPTER 5: SOLUTIONS FOR SUSTAINABLE TRANSPORTATION

The previous section offers insight into how communities are approaching the integration of sustainability into their respective planning and development processes and products. This chapter aggregates the experiences and lessons learned into an inventory of sustainable solutions. Four general categories of solutions are outlined—policy solutions, legislative solutions, planning solutions, and financial solutions—although it should be obvious that the boundaries between these categories are ambiguous and porous. No clear demarcation exists.

## POLICY SOLUTIONS

Several of the previous cases include policy plans, as opposed to physical plans, as the primary tool for sustainable development. Often, policy plans are used in conjunction with physical, or land use, plans and they are developed in coordination with each other. This section looks specifically at policy solutions to moving beyond the barriers which confront sustainability at the local level.

A policy plan, or guidance document, generally provides a framework of the desired direction, scope, and type of development desired by a community. Statements within a policy plan may include such words as "encourage," "direct," or "support." The Planning Act of Ontario, for example, includes the following guidance:

- promotion of more efficient use of existing land and infrastructure;
- support for renovation, infilling, redevelopment through proper zoning restrictions; and
- encouraging new developments to have a compact form, mix of uses, and densities that efficiently use land, infrastructure and public service facilities (Transportation and Climate Change Collaborative 1995).

Strategic plans often include policy measures, such as the UK Sustainable Development Strategy (Quinn 1994). This plan includes four major policies to make British transport more sustainable:

1. Tax and pricing measures for full user cost accounting for transport users;
2. Planning and assessment improvements for transport infrastructure decision making;
3. Improvements in vehicle technology; and
4. New land use planning measures to reduce travel needs.

Martin (1995) identifies six broad policy options available for development and implementation in the local context:

1. Transport demand management;
2. Transport supply and traffic management;
3. Improve service quality and efficient public transit;
4. Improve multi-modal facilities;
5. Optimize urban space and infrastructure, and long-term land use planning; and,
6. Promote and support public transportation.

The most wide ranging statement on sustainability in the United States, the President's Council on Sustainable Development, delivered its final report in the spring of 1999. In a series of recommendations, the report develops a policy approach for sustainable community development. Chapter 4 of the report, "Metropolitan and Rural Strategies," focuses on policies and actions that communities can undertake in order to move toward sustainability. Three action areas are of primary concern: 1) providing information and technical assistance; 2) providing economic incentives and financial assistance; and 3) developing local capacity and partnerships. Further, the report stresses that green infrastructure and land use and development are two strategic areas that hold promise for the future of communities. Green infrastructure is defined as "the network of open space, airsheds, watersheds, woodlands, wildlife habitat, parks, and other natural areas that provides many vital services that sustain life and enrich the quality of life" (

President's Council on Sustainable Development 1999). Community-level transportation policies and decisions have significant impact on green infrastructure and land use practices.

Finally, the European Conference of Ministers of Transport, in their extensive study of 20 countries and 132 cities, identified a general inventory of policies and mechanisms currently being used to try and solve the unsustainable transport problem (1995). Table 5 lists these policies.

In general, then, policy solutions for sustainable transportation come in the form of guidelines, policy objectives and goals, and broad statements of community vision. Although they can direct development and decision making, unless they are supported by legislation or mandates, they may remain nothing more than suggestions.

**LEGISLATIVE SOLUTIONS**

Legislation, at any level, can support policy solutions by mandating compliance and requirements for sustainability, or sustainability-related processes. The statewide growth management and land use legislation shown in the Oregon cases illustrate the utility of this approach. In spite of complex relationships and coordination problems among state, county, and local stakeholders and agencies, the Oregon model appears to be an effective means of educating stakeholders and requiring more environmentally sensitive planning and development.

**Table 5. The Phases and Tasks of the Local Development Planning Process**

| | |
|---|---|
| Phase I | Data gathering and analysis<br>▸ Determining economic base<br>▸ Assessing current employment structure<br>▸ Evaluating employment needs<br>▸ Examining opportunities for and constraints on economic development<br>▸ Examining institutional capacity |
| Phase II | Selecting a local development strategy<br>▸ Establishing goals and criteria<br>▸ Determining possible courses of action<br>▸ Developing a targeted strategy |
| Phase III | Selecting local development projects<br>▸ Identifying possible projects<br>▸ Assessing project viability<br>-Community -Commercial<br>-Location-Implementation |
| Phase IV | Building action plans<br>▸ Preassessing project outcomes<br>▸ Developing project inputs<br>▸ Establishing financial alternatives |
| Phase V | Identifying project structures<br>▸ Specifying project details<br>▸ Conducting detailed feasibility studies<br>▸ Preparing business plan<br>▸ Developing, monitoring, and evaluating program |
| Phase VI | Overall development plan preparation and implementation<br>▸ Preparing project plan implementation schedule<br>▸ Developing an overall development program<br>▸ Targeting and marketing community assets<br>▸ Marketing financial needs |

Source: EMCT 1995

Another example from Cape Cod illustrates how a state mandate for regional planning can be an effective solution to regional planning problems. Responding to pressure and concern from the Cape Cod region, a planning commission was established to direct growth and development in the area. Because of its significant value to the state, this directed approach was possible.

At the federal level in the United States, the Environmental Impact Statement process, established in the National Environmental Policy Act can have an impact on local-level decisions as they pertain to sustainable transportation (Deakin 1993). Regulatory requirements of federal environmental laws will continue to impact local decisions that are related to federal projects. This is particularly true for major urban areas that plan highway capacity building projects.

**PLANNING SOLUTIONS**

Beyond policy and legislative solutions are found planning solutions, which may be more localized, specific to certain contexts, and implementation, or action, focused. These are solutions most closely resembling planning "tools" and "methods." Often sustainable planning solutions require attention to different indicators or measures than are typically collected or used, or even the inclusion of different types of planning or other disciplines. The planning process is a logical place for new approaches to be considered, however, as it is the mainstay for community involvement, direction, and action.

As previous sections have noted, however, getting from the traditional to the sustainable can be difficult. One of the problems with comprehensive planning is that, although it may contain all the necessary elements for sustainability, are seldom integrated as are applied (Schwab and Brower 1997). Housing may be totally separated from transportation, for example, in reality, even if they are included in the same planning document. Resolving this dilemma requires a conscious effort on the part of the community and its planners.

One of the planning solutions is to borrow, or integrate, methods or approaches from other types of planning. An obvious link exists between environmental planning and general planning for sustainability, however, environmental planning is often considered to be too narrow and apolitical to stand alone. Brugmann adopts the standards and applications of environmental planning to the more politically charged general planning context. He identifies five key areas of integration:

- maintaining the integrity of community development through the development of participatory approaches;
- creating a common picture of current development practices;
- assessing systemic problems and conditions;
- measuring global impacts of local decisions; and
- maintaining strategic, local control of development processes in spite of regional and global pressures (Brugmann 1996).

The American Planning Association (APA), in its *Policy Guide on Sustainability* (1999) states that "to achieve sustainability, a connected, holistic approach to community planning is needed." In agreement with Brugmann (1996) above, the guide states further that "planning must move beyond excessive fragmentation and specialization, which lack a broader view of how the various pieces fit together, toward a systems approach that recognizes the fundamental links among all the issues that we deal with on a daily basis." Motion III of the *Guide*, states that the APA and its chapters believe that its transportation policies should support:

1. Reduced dependence upon fossil fuels, underground metals, and minerals, through:
    a. Reduction in vehicle trips and vehicle miles traveled through compact, infill, and mixed-use development.
    b. Use of alternatives to the single occupant automobile, such as walking, cycling, and transit.
    c. Development and use of renewable fuel source vehicles.

d. Encourage pedestrian and bike use through local street design.

2. Meeting human needs fairly and efficiently by:
    a. Providing affordable and efficient transportation alternatives for low-income households, the elderly, and the rest of the 30 percent of the U.S. population that do not own cars (American Planning Association 1999).

The Canadian Institute of Planners lists five types of "tools" that planners could develop for sustainable planning. These categories include general suggestions for specific tools or approaches:

- Policy Tools. Includes general guidelines (policy statements) and specific indicators of sustainability.
- Design Tools. Includes techniques and data for "day-to-day" planning (transport, housing, etc.).
- Information Tools. Includes both information and data for planning and for the exchange of information in the community.
- Fiscal Tools. Includes incentives, disincentives, subsidies, elimination of inappropriate subsidies, life-cycle costing, and appropriate government procurement polices.
- Decision-making Tools: Includes the land use planning process, assessment decision review mechanisms, mediation skills, stakeholder and interdisciplinary teams, and public participation mechanisms.
- Education Tools for Planners: Includes workshops, case studies, media training, and small groups sessions.
- Tools for Public Education: Includes publicly visible feedback mechanisms, progress reports, and support of effective sustainability spokespersons (Canadian Institute of Planners 1990).

Another list of recommendations is provided by Saunders (1997) as he links ecology with community design. The intent of this linkage is to create "ecological communities," or those that imitate the "efficiency in nature, where there is a balance on inputs and outputs of energies, products, and waste." These recommendations could certainly be viewed as objectives for sustainability and be included in any comprehensive planning effort:

1. *Monitor Input and Output of Community Resources*. This requires that the community be aware of what they produce, what they need to produce it, and what waste results from production. This also requires knowledge, and use, of quantifiable indicators in order to communicate objectives ( a certain percent reduction in water use). According to Saunders, "Numbers make it easier for the public and politicians to visualize the efficiency of ecological communities" (1997).
2. *Involve the Community*. Sustainability and ecological communities must be linked to the public through their interest and involvement.
3. *Employ Alternative Housing Arrangements*. Communities should explore higher density housing arrangements, cluster housing, or cooperative housing.
4. *Design for the Pedestrian*. Reduce automobile dependency in the community through design and placing a priority on the pedestrian.
5. *Incorporate Natural Areas into the Community*. An absence of nature in a community contributes to a community's lessened perception of the value of nature. Link nature with community where possible.
6. *Use Experimental Projects to Induce Gradual Change of Opinion*. "The general public understands models, especially working one, better than concepts" (Saunders 1997). Built projects provide examples to the public and decision makers and can persuade them as to the value of sustainability.
7. *Change the Role of the Community Designer*. The typical planner or community designer may be ill-prepared to integrate concepts and methods from ecology or

environmental planning. Saunders suggests an integrated team approach incorporating and utilizing community members with a variety of expertise.

8. *Plan in Stages and for the Long Term*. Moving toward sustainability and ecological communities in stages allows the community to revisit and revise their original objectives over time.
9. *Share Information*. Saunders advises setting up organizations that can share information among the community and stakeholders. This organization can also serve as a forum for discussion.
10. *Maintain a Balance*. Too much emphasis on the ecology of a community can have a negative impact if other matters, or residents' needs, are ignored.

Finally, Rees (1995) recognizes the importance of growth management strategies, environmental legislation, and other tools that planners apply, but warns that these measures are all too often applied in reaction to conditions, rather than with foresight. One of the reasons for this reactive approach is that there are rarely funds available for anything but responding to problems. This situation is discussed in the next section.

**FINANCIAL SOLUTIONS**

Financing sustainable solutions to transportation problems remains, perhaps, the most significant obstacle in any community. Inroads have been made, however, and many of the plans and resources reviewed for this report include suggestions, if not actual promises, of financial resources for sustainability.

The final report of the President's Council on Sustainable Development (1999) includes finance-related recommendations for assisting communities. Seven activities are identified that focus on encouraging the market for sustainable development:

1. Research and experiment with new market mechanisms that promote sustainable community development goals.
2. Broker strategic alliances between urban and rural markets.
3. Increase community access to capital for sustainable community initiatives through cooperation between federal, state, and local agencies and the private sector.
4. Promote shift in tax policies and subsidy reform.
5. Promote holistic economic development planning.
6. Promote business and industry investment and involvement in sustainable community development.
7. Promote sustainable strategies to workforce development.

In general, these recommendations suggest new partnerships between the banks, credit unions, and insurance companies in a community with sustainable development initiatives. These partnerships will require nurturing, as traditional lending methods and requirements will have to be reevaluated as to their applicability in a sustainable context. Recommendation 5 above is particularly important, as it suggests a holistic perspective within a community. All too often, economic development decisions are made with a consideration of only a small number of potential impacts. Community-wide impacts should be evaluated, according to this recommendation.

One simple financial technique for supporting sustainability is the redirection of existing resources (Schwab and Brower 1997). While easier said than done, this approach can be the result of a community visioning process that culminates in the development of action statements. What a community hopes to accomplish, after being translated into objectives, can be linked to the financial means of accomplishing these objectives, even if it requires doing things differently. This approach is illustrated in the Cape Cod case from Chapter 4. When the residents were surveyed as to their vision of the future for Cape Cod, they expressed support for higher taxes, if

growth management and limits on growth would accomplish the objectives. The Cape Cod regional plan also links its development objectives with state programs for tax credits, tax abatements, and tax increment financing techniques to encourage appropriate development. A cooperative program among local development agencies, lenders, and small business is also suggested to support local investment and business incubation in Economic Opportunity Areas (Cape Cod Commission 1996b).

Another strategy of financial support for sustainability is suggested by Nozick (1994) through the transfer of financial power from outside ownership to local ownership. This approach recognizes the strength among the local agencies, grassroots organizations, and local coalitions for directing their community towards sustainability. The success of the Brazos Greenways Council in securing national grant funding is an example of the transfer of power to communities. Nozick specifically identifies four mechanisms for sharing financial power at the local level:

- *Community Development Corporations*. These are formed to represent local development initiatives and can receive and distribute funds from private and public sector sources. Neighborhood associations can also serve as community development corporations, if the members are active enough to attract funding.
- *Community Land Trusts*. A community land trust is established to purchase local property for local development or use for sustainable purposes. This mechanism is often used for preservation of historic properties or agricultural land.
- *Community Loan Funds*. Community-based non-profit organizations can develop low-interest loan funds for high-risk business start-up initiatives, or for grassroots development of sustainable initiatives. Habitat for Humanity is an example of a community local fund mechanism.
- *Cooperatives*. Cooperatives, such as food or agricultural coops, place control on a business in the hands of its members. These organizations can be developed to

become self-reliant in that the members support each other with their purchasing, financial, and decision-making power.

One of the most common recommendations found in the sustainable development literature is for cooperation and coordination among community stakeholders. In regard to financing sustainability, one cooperative mechanism is through linking the comprehensive plan with the economic development plan (Gubala 1995). Often these plans are developed without consideration for their impact on the other. Coordination between the two processes, and references between the two, can encourage economic development that supports the sustainable objectives of a comprehensive plan. From a personnel perspective, the economic development staff and the general planning staff should work in concert with each other as these plans are developed. This would produce cost-savings in resources, provide better information to both processes, and involve the community more in economic development than is the tradition.

One of the most comprehensive and wide-ranging frameworks for responding to financial barriers to sustainability is found in the expanded discussion of Decision Principle 13, from the Transportation Association of Canada's "A New Vision for Urban Transportation." An updated briefing, published in 1997, develops a model for use by urban areas to finance their sustainable visions and transportation activities. The goal of the model is "to provide adequate a secure funds to deliver urban transportation systems that support new visions and move toward a sustainable future." In order to adequately provide for the maintenance of the urban transportation infrastructure, TAC recommends that funding should meet the following criteria:

- stable and predictable over time;
- least cost to the environment, society and the economy;
- "transparent," or open and easily understood by decision makers and the general public;
- simple, and carry a low administrative burden;

- increasingly derived from users in proportion to benefits received;
- dedicated, with revenue directed back to transportation programs;
- local government should have access to funds if assigned additional responsibilities;
- public involvement and support would play an important role; and
- measurable results, and performance indicators should be used (Transportation Association of Canada 1997).

TAC further recommends that a finance model consist of the following four elements:

- *Maximize Government Efficiency and Effectiveness*. This should be undertaken prior to considering any new taxes or sources of revenue. Methods could include restructuring, the use of bench marking and performance indicators, and streamlining processes.
- *Make the Best Use of Existing Transportation Dollars*. Efficient use of transportation funds should be considered for design, construction, operations, and maintenance. Methods include reallocation of funds for more sustainable investments, coordination of multimodal transportation modes and land use planning, life-cycle cost accounting, and a comparison of large project benefit to multiple small-project benefits.
- *Reallocate and Dedicate a Portion of Existing Transportation Derived Revenues*. Move toward a system where the user is charged for consumption.
- *Introduce and Dedicate New User Fees*. These will be used to close the gap between what is currently available and what is needed to achieve the sustainable vision. Examples include, additional gas fees, additional vehicle license fees, revenue-based parking fees, toll roads and bridges, congestion pricing, property development charges, and right-of-way fees.

These methods and recommendations can be used to focus attention, first, on the unsustainability of traditional methods and practices of transportation funding. Second, they can direct

stakeholders to a variety of possibilities for redirecting funds to support sustainable visions and objectives. What should be evident from this discussion is that the best plan or sustainable community vision will flounder unless it is linked to a serious consideration of how it is to be funded.

# CHAPTER 6: A SCENARIO FOR SUSTAINABLE TRANSPORTATION

The previous chapters provide a framework of information, methods, and practices that can be aggregated and generalized into a strategic model for moving transportation plans from an unsustainable condition to the sustainable. This can be accomplished by developing a general scenario model. The first step in model development is to identify traditional elements found in comprehensive plans and link their objectives to sustainability objectives and indicators. This linkage provides a transformation model that can help direct planners toward sustainability. The second step is to apply the model, which requires transformation of various components of the planning process itself. The final step is a consideration of the political feasibility of moving toward sustainability and the role that the planner assumes in determining this feasibility. The purpose of this chapter is to develop these steps into a useful scenario building tool for planners, public administrators, concerned citizens and advocates, and other stakeholders.

## STEP ONE: MODIFYING THE COMPREHENSIVE PLAN

Many of the elements of a traditional comprehensive plan found in Chapter 3 have direct equivalents with those examples from the previous section on sustainability. This section focuses on linking these equivalent elements in a modification model that can be applied as a community seeks direction in moving toward sustainability. Based the most common land use and transportation elements found in comprehensive plans, the model focuses on four main sectors:

1. land use,
2. transportation,
3. environmental factors, and
4. economic development.

Within a comprehensive plan, for example, each of these sectors supports explicit objectives and methods. Traditional objectives and methods, even though they may form barriers to sustainability, can provide a common starting point for moving toward sustainability. Table 6 illustrates the linkages between the traditional and the sustainable objectives, as well as selected indicators of sustainability that can be applied. As a generalized modification model, the linkages in Table 6 can be expanded and adopted to localized conditions, availability of data, or political realities. The simple process of identifying traditional approaches to transportation and land use planning in a community and linking them to sustainable approaches and indicators is an important first step in finding out where a community lies on the continuum between the unsustainable and the sustainable.

## STEP TWO: APPLYING THE MODEL

Applying the model developed in the previous section involves a multi-step process. This section outlines these steps as a circular series of four transformations: (1) transforming the objectives of a community and its plan, (2) transforming the plan itself, (3) transforming implementation of the plan, and (4) transforming the operational measures of success. As was suggested for the four basic elements of the modification model, these four steps of transformation can be considered independently as strategies are developed and pursued, yet all are integrated as they feed back into each other through the evolution of the overall system over time.

### Transforming the Objectives

Transforming the objectives of a comprehensive plan is a political and social process. In order for a community to move toward sustainability, the justifications for sustainability must be evident to elected officials and to the community as a whole, in the general public and private interests, such as builders and developers. The primary method of transformation in this step is through the identification of community objectives and subsequent conditions that are not

conducive to sustainability and the identification and justification of alternatives. Sustainable alternatives should then be presented to the community for discussion. The critical role of the planner in this stage of the transformation process is discussed in a later section.

**Table 6. Modification Model for Sustainable Comprehensive Plans**

| Comprehensive Plan Elements | Traditional Objectives | Sustainability Objectives | Sustainability Indicators |
|---|---|---|---|
| Land Use | Zones and separated land uses | Integration of uses | Mixed use neighborhoods |
| | | Employment opportunity near residential areas. | Job/housing balance |
| | Long-term approach based on current trends | Long-term approach based on changing attitudes and uses | Integration of sustainable measures |
| Transportation | Reduce congestion through construction | Reduce congestion through construction | VMT reduction, non-rec. Travel reduction |
| | Mobility | Mobility through alternative modes | Increased transit use |
| | | | Pedestrian/bicycle facility development |
| | Access through mobility | Access through alternative means | Telecommuting |
| Environmental | Provide adequate service levels | Provide efficient service levels | Water service density |
| | | | Reduce water usage per household |
| | | | Number of recycling households |
| | Landfill development as needed | Solid waste regeneration | Number of recycling businesses |
| | "Encourage" environmental objectives | Mandate environmental responsibility | Env. impact assessment in development review |
| Economic Development | Attract new business | Attract "green" business | Business recycling/ efficient resource use |
| | Suburban development | Urban in-fill/redevelopment | Regeneration |
| | Attract real estate development - subdivisions | Attract real estate development - transit oriented/mixed use | TOD development |

**Transforming the Plan**

Once a community is made aware of unsustainable objectives and directions and alternatives are accepted, the movement toward sustainability is codified in the comprehensive plan process. The transformation of a comprehensive land use and transportation plan should not only be undertaken by city staff or consultants: it should be a cooperative process involving all potential stakeholders. Public involvement in this process is critical in order for concerns to be included and operationalized. This step will also require the consideration of new data and analysis methods and the inclusion of qualitative sustainability measures. The modification model described above can be applied at this step to illustrate possible alternatives to traditional plan approaches and to suggest appropriate sustainable indicators. It should be noted, however, that the model represents general objectives and indicators that can be applied at this step and should not be considered a comprehensive listing. Many more indicators have been suggested and applied that may be more appropriate, depending on a particular planning context.

**Transforming Implementation**

Implementing the transformed plan will necessitate new approaches, as well as the new data and analysis methods mentioned above. Typically, implementation of a comprehensive plan occurs as the city and the private sector respond to needs and perceived needs of the community and act in compliance with guidelines and restrictions imposed through the plan, zoning ordinance, or development regulations (Efrussy 1992). One major problem associated with implementing sustainable objectives is that some objectives may have greater support than others. This disparity can influence the exclusion of sustainable objectives from some tools or processes of plan implementation. Sustainability needs to be maintained across all sectors or elements within a community (Branch 1985). What is vital to the success of the implementation of a sustainable plan is that complementary objectives and indicators are integrated into all the available tools and processes for guiding the future direction of the community. It is not sufficient to only include general objectives of sustainability in the introduction of a comprehensive plan document. It will

be necessary to link sustainable indicators to the development review process and to economic development strategies, too. In this regard, then, transforming implementation also requires transformation of the means of implementation and moving these tools and processes toward sustainability.

**Transforming Operational Measures of Success**

Any change in the approach to comprehensive planning suggests that existing data and methods of analysis may be insufficient to measure success. There is also a risk of adhering to existing data and methods simply because they are available and trusted. The resistance to change and innovation by implementing agencies is well (Wilson 1989). Existing measures may, indeed, be sufficient for measuring sustainability, either alone or in tandem with other measures, but a reevaluation of their utility in regard to new plan objectives must be considered. Many examples and methods are available for including externalities or qualitative variables into more traditional cost-benefit analysis (Beatley and Brower 1993; Felsenstein et al. 1997; Dess1995).

**Summarizing the Transformation Process**

These four steps require separate consideration as distinct steps in a larger process, yet all build and depend on each other. This is not a linear or static process—each transformation step will influence the next, while at the same time suggest adjustment for each previous step. Each of the four steps contributes to the ultimate objective of local sustainability. In turn, as a community moves toward sustainability, it will influence further transformations. Also, a single transformation within a new comprehensive plan, such as the inclusion of any one of the objectives or indicators from the modification model, can encourage the further justification and transformation of larger scale community objectives. Figure 3 illustrates these relationships and the theoretical process flow of the four integrated transformations.

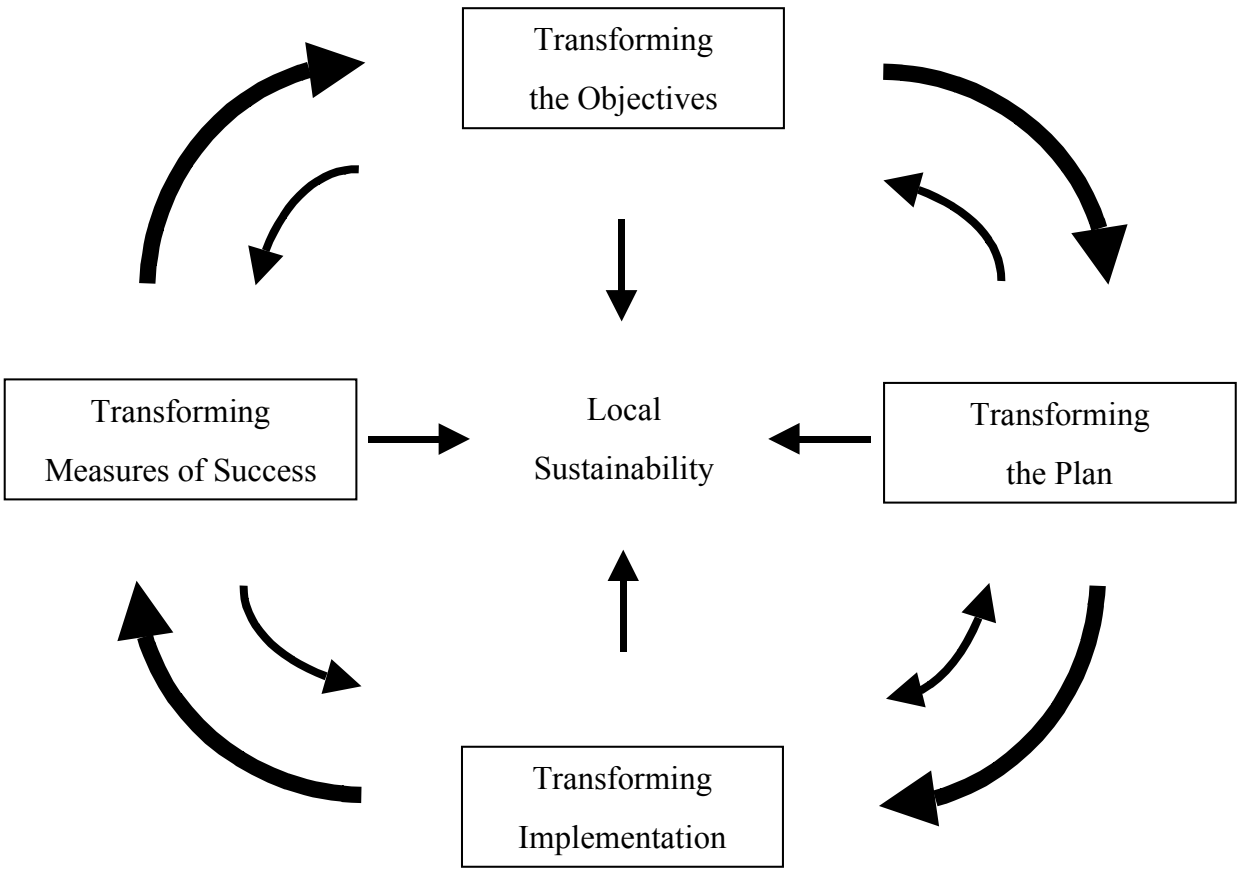



**Figure 3. Transformation Process Flow Model**

It should be stressed at this level of model building and generalization that the four transformations are, by necessity, simplistic representations of reality. Any one of these steps is a potentially painful, conflictual, and lengthy process. Model building requires such simplicity, however, as it aims to initiate discussion and serve as a spring board to contextual application.

## POLITICAL FEASIBILITY AND THE ROLE OF THE PLANNER

The stark reality of urban planning in the United States is that a comprehensive plan and its associated processes are essentially political, and the pressures applied to their development and implementation are political in nature. As such, this section briefly considers the political feasibility for attempting to modify a comprehensive land use and transportation plan into one

which embraces sustainability. A simple tool for assessing the political climate for supporting sustainability is described. As a primary participant and potential advocate for this modification, the role of the planner in this process is then discussed.

**Political Feasibility**

Much of the literature on sustainable development underscores the difficulty in operationalizing and implementing its concepts because of the conflicts that inevitably arise, for example, between environmentalists and developers. Conflict between environmental and economic interests are often put at polar ends of a continuum, with consensus floating somewhere in the middle, if anywhere at all. Some studies of sustainable development are even devoted to conflict resolution techniques or consensus building (Campbell 1996; de Graaf et al. 1996). Because of the assumption of inevitable conflict, elected officials often avoid considering sustainability as an alternative. The consensus needed between stakeholders may appear to be too elusive or take too long to negotiate for the short-term outlook of many politicians. The result at the local level will be inertia and an avoidance of change as any movement toward sustainability is interpreted as politically unacceptable (Reid 1995).

Rather than accept the inevitability of conflict, this report takes the position that conflict can be mitigated in the transformation process and, as Figure 3 illustrates, transformation within any of the four steps can evolve into ever increasing movement toward the center and the goal of local sustainability. With better information through the transformation and integration of sustainable objectives and processes in the planning and development tools, there will be less conflict to resolve, and political support will increase and be sustained across elections. The key, however, is for those stakeholders interested in promoting sustainability in their community to assess the realities of the local political climate toward sustainability and act strategically to encourage transformation in areas where transformation is most likely to occur.

The local political climate will often dictate the rate and scale of sustainable objectives that are incorporated over time. A favorable political climate for change will support rapid and comprehensive change; an unfavorable climate will limit the possibilities for adoption and support only incremental change, if any at all. It is up to the sustainability advocates to gauge the political climate and determine how to proceed. Figure 4 illustrates a general assessment tool that can be used for determining the political climate for change for any of the elements included in the modification model. For example, if the political climate toward sustainable land use objectives is assessed as positive, the potential magnitude of change that can be encouraged is high. Conversely, if there is negative political support for alternative transportation modes, the scale of change that is pursued should be incremental. Once an assessment of potential change is made, transformation in those areas can be initiated through application of the modification model described in the previous section. This strategy does not guarantee that the political or economic climates will not change over time, however, it is easier for newly elected politicians to support alternatives that have been implemented and proven successful than to initiate comprehensive changes from the ground up.

This approach to assessing the political climate for change suggests neither an incremental approach to change nor a more comprehensive approach. A strategic assessment of the political climate merely illustrates the opportunities available. In this manner, the approach to be promoted can be used as a starting point for the movement toward sustainability.

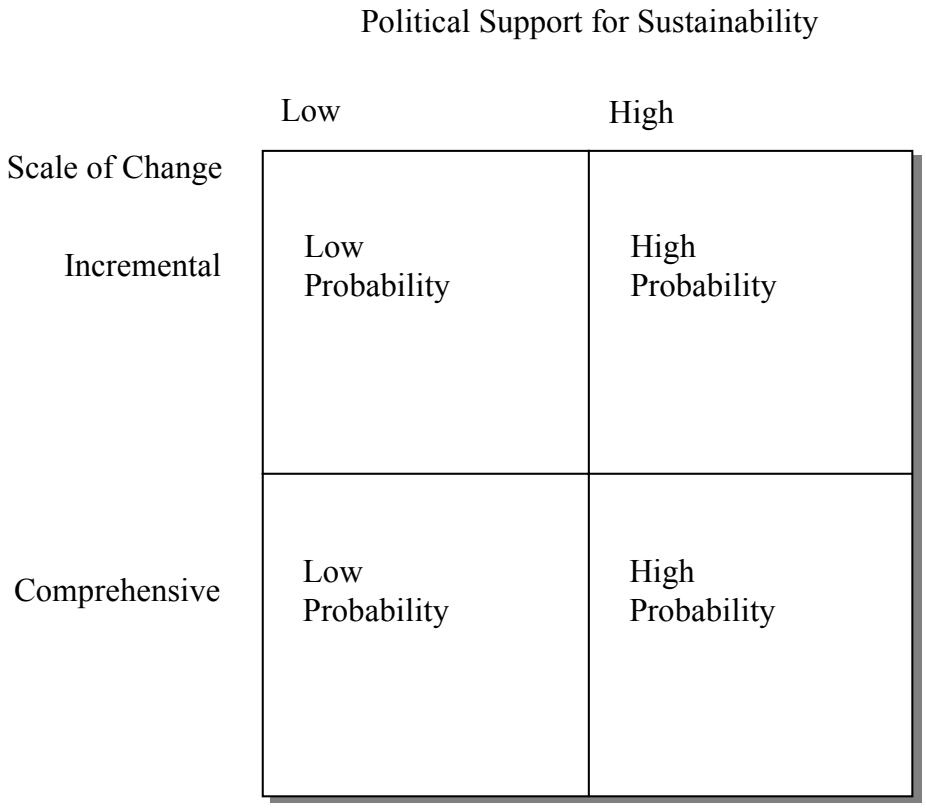



**Figure 4. Political Climate Assessment Tool**

**The Role of the Planner**

It should be obvious that the number and diversity of potential stakeholders in sustainable development efforts, both supportive and non-supportive, are significant. From the perspective of this report, and the modification model presented here, the community planner and planning agency are considered primary stakeholders in this effort. Community planners, whether through direct development of comprehensive plans or through interaction with consultants, are in a unique position, relative to elected officials, private or economic interests, and the general public. This position allows considerable discretion in assessing the political climate for change, assessing public and private attitudes toward sustainable development, refining sustainable objectives and adopting sustainable indicators, and in maintaining interest in and promoting the successes of a move toward sustainability.

The Canadian Institute of Planners has recognized these advantages of the planner as advocate and adopted sustainability as the "intent and central operating principle of planning" (Canadian Institute of Planners 1990). Among other responsibilities, the American Planning Association recognizes that planning staff should "aid in development of goals, objectives, and policies" and "provide continuity by introducing new community officials to the comprehensive plan, provide training, and understanding of the plan's purpose, content, use, implementation, and vision" (Efrussy 1992). Further, Clayton and Radcliffe identify the planner as advocate for "promoting the idea of sustainability to other organizations, and helping to educate the public" (Clayton and Radcliffe 1996). Beatley, too, stresses the role of the planner in "pointing out the unsustainability of conventional planning and development policy" (Beatley 1995). Resolving the long-term planning perspective on sustainability with the short-term political perspective is a major responsibility of the planner.

# CHAPTER 7: CONCLUSIONS

This report illustrates the significant barriers to moving toward sustainability and sustainable transportation that a community must contend with. In spite of these barriers, some communities, regions, and states, are recognizing the impact transportation decisions have on the environment and quality of life, and are making moves to reduce automobile dependency, integrate alternative modes into transportation plans, and incorporate general concepts of sustainability into community visions. This final chapter offers some conclusions derived from this report, some observations on the state of sustainable transportation, as well as some recommendations for community planning, and for further research.

The ambiguous nature of the term "sustainable development," and its derivatives, encourages extraordinary debate, anxiety, and frustration. Debate occurs when parties attempt to refine the concept too specifically to the detriment of the overall idea and objective; anxiety occurs when traditionalists are confronted with the necessity or stimulus to change their approach and attitude; frustration occurs when debate and anxiety collide in the real world of transportation planning and decision making. The significance of the concept of sustainability lies not in its definition, however, but in its application. The cases included in this report illustrate a wide variety of approaches, methods, and techniques that are being applied as communities move beyond the "way things have always been done," to the "way things can be done and should be done."

## RECOMMENDATIONS

Recommendations included in this report are in two categories: recommendations for communities, planning agencies and transportation agencies, and recommendations for further research:

- Sustainability and sustainable transportation need to be linked to the vision of the future that a community formulates. It is in this process that these concepts will gain

a foothold that can be built upon as a community evolves. Unless a community recognizes the negative implications of unsustainable practices, it will be very difficult to move forward.

- The planning and development processes in a community or agency need to be open to public participation in order for the vision to take hold. Providing a forum for ideas and alternatives is critical for moving toward sustainability.
- Planning and economic development processes need to be integrated. The conflict between these two is reflected in the different attitudes, objectives, and professional norms of planners and developers.
- The traditional paradigms of engineering and planning, as they are applied in a community, need to be evaluated for their relevance to sustainability. Do adjustments need to be made in how we operate in a "sustainable" world? One area which should be scrutinized is the standard operating procedures of community engineering and planning agencies. Are these procedures actually barriers to change and the integration of sustainable concepts?
- Community, as well as regional and state-level, financial decision making needs to be more open to the opportunities provided by sustainable development initiatives. The cases shown in this report include some success in moving in this direction, but unless significant changes are made in how we finance development and perceive financial risk in the community, the move toward sustainability will be more difficult.

Research efforts in the future should be focused on several areas:

- Communities and the research community need to focus on collecting data and collection methods for compiling sustainability indicators. Traditional indicators are not sufficient to support sustainable objectives. Additional indicators, such as quality of life and more qualitative indicators, need to be developed and applied in the community to direct decision makers.

- The role of institutions, such as state transportation agencies, planning agencies, and public works departments needs to be evaluated in regard to how they may, or may not, respond to the integration of sustainability as an objective. Under what conditions are institutions more likely to embrace sustainability as an objective?
- Finally, what is the role of planning, public administration, and engineering education playing the move toward sustainable communities? The education of professionals is critical to the achievement of sustainable objectives at any scale. Are we doing enough to encourage change in how professionals are educated to move effectively toward a more sustainable future?

This report has illuminated many examples of planning and development rhetoric that "encourages" or "supports" sustainability. A final normative question needs to be asked, however, and that is: Can plans and planners ever move beyond "encouraging" sustainability, to "requiring" sustainability? If we continue on an unsustainable path of transportation alternatives and decisions, will we eventually have to mandate sustainability within our society? Perhaps the Oregon model comes closest to this situation, at this time, yet even it has had to withstand constant pressure and scrutiny over the past 25 years, and its future is in constant doubt. This report identifies many alternatives to mandated sustainability that can be achieved through advocacy and cooperation, as well as methods for integrating the objectives of sustainability into the planning process. These alternatives are available for application in the development, finance, and implementation of sustainable transportation in the community, provided the will and vision is there to open a window of opportunity.

# REFERENCES


American Planning Association. 1999. *American Planning Association Policy Guide on Sustainability*. Chicago, IL: APA.

BGC. 1999. *Brazos Greenways Council Newsletter*. 1(3):1-8.

Banister, David, and Kenneth Button. 1993. "Environmental Policy and Transport: An Overview." In *Transport, the Environment and Sustainable Development*, eds. David Bannister and Kenneth Button. London: E&FN Spon.

Beatley, Timothy. 1995. "The Many Meanings of Sustainability: Introduction to a Special Issue of JPL." *Journal of Planning Literature*. 9:339-342.

Beatley, Timothy. 1995. "Planning and Sustainability: The Elements of a New (Improved?) Paradigm." *Journal of Planning Literature*. 9:383-395.

Beatley, T., and D.J. Brower. 1993. "Sustainability Comes to Main Street." *Planning*. 59:16-19.

Benfield, F. Kaid, Matthew D. Raimi, and Donald D.T. Chen. 1999. *Once There Were Greenfields: How Urban Sprawl is Undermining America's Environment, Economy, and Social Fabric*. Washington, D.C.: Natural Resources Defense Council/Surface Transportation Policy Project.

Benner, Richard. 1998. *Growth and the Northwest Landscape*. Salem, OR: Department of Land Conservation and Development.

Black, W.R. 1996. "Sustainable Transportation: A US Perspective." *Journal of Transport Geography*. 4:151-159.

Blakely, Edward J. 1994. *Planning Local Economic Development: Theory and Practice, 2nd ed.* Thousand Oaks, CA: Sage Publications.

Branch, M.C. 1985. *Comprehensive City Planning: Introduction and Explanation*. Washington, D.C.: American Planning Association.

Briassoulis, Helen. 1989. "Theoretical Orientations in Environmental Planning: An Inquiry into Alternative Approaches." *Environmental Management* 13:381-392.

Brook, C.A. 1995. "The Implementation of City Transportation Strategies—a Planning Perspective." In *Urban Transport and the Environment for the 21st Century*, ed. L.J. Sucharov. Southampton: Computational Mechanics Publications.

Brugmann, Jeb. 1996. "Planning for Sustainability at the Local Government Level." *Environmental Impact Assessment Review* 16:363-379.

Campbell, Scott. 1996. "Green Cities, Growing Cities, Just Cities: Urban Planning and the Contradictions of Sustainable Development." *Journal of the American Planning Association* 62:296-312.

Canadian Institute of Planners. 1990. *Reflections on Sustainable Planning: Volumes 1 and 2.* Ottawa, Canada: CIP.

Cape Cod Commission. 1999. Web site: www.capecodcomssion.org

Cape Cod Commission. 1996a. *Final Regional Plan: Introduction*. Cape Cod, MA: The Commission.

Cape Cod Commission. 1996b. *Final Regional Plan: Issues*. Cape Cod, MA: The Commission.

Cape Cod Commission. 1996a. *Final Regional Plan: Transportation*. Cape Cod, MA: The Commission.

Cape Cod Commission. 1996a. *Final Regional Plan: Coordination*. Cape Cod, MA: The Commission.

Center for Sustainable Transportation. 1998. "Why a Sustainable Transportation Monitor?" *Sustainable Transportation Monitor* 1:1-2.

City of Bend. 1998. *Bend Area General Plan*. Bend, OR: The City.

City of College Station, Texas. 1997. *The College Station Comprehensive Plan*. College Station, TX.: The City.

Clayton, A.M.H., and N.J. Radcliffe. 1996. *Sustainability: A Systems Approach*. Boulder, CO: Westview Press.

Colgan, Charles S. 1997. "'Sustainable Development' and Economic Development Policy: Lessons from Canada." *Economic Development Quarterly* 11:123-137.

de Graaf, H.J., C.J.M. Musters, and W.J. ter Keurs. 1996. "Sustainable Development: Looking for New Strategies." *Ecological Economics* 16:205-216.

Deakin, Elizabeth. 1993. "Policy Responses in the USA." In *Transport, the Environment and Sustainable Development*, eds. David Bannister and Kenneth Button. London: E&FN Spon.

Department of Land Conservation and Development. 1996. *Oregon's Statewide Planning Goals and Guidelines*. Salem, OR: The Department.

Deschutes County. 1998. *Deschutes County Transportation System Plan*. Deschutes County, OR: The County.

Deschutes County. 1999. *Deschutes County Comprehensive Plan*. Deschutes County, OR: The County.

Dess, M. 1995. "Harmonising Transport Policy to Achieve Environmental, Social, and Economic Goals." In *Urban Transport and the Environment*, ed. L.J. Sucharov. Southampton, UK: Computational Mechanics Publications.

Duncan, Bruce, and John Hartman. 1996. "Sustainable Urban Transportation Initiatives in Canada." Presented to the APEC Forum on Urban Transportation. Seoul, Korea.

Efrussy, A.M. 1992. "Introduction to the Comprehensive Plan." In *A Guide to Urban Planning in Texas Communities*, eds. W.S. Dahlstrom and M.D. McAnelly. Austin, TX: Texas Chapter of the American Planning Association.

European Conference of Ministers of Transport. 1995. *Urban Travel and Sustainable Development*. Paris, France: Organisation for Economic Co-operation and Development.

Felsenstein, D., J. Persky, and W. Wiewel. 1997. "Integrating Hard-to-Measure Externalities into the Evaluation of Local Development Projects." *Town Planning Review* 68:55-79.

Ferrary, C.K. 1995. "Sustainability and Transport: Helping Ensure Policies and Infrastructure Can be Sustainable." In *Urban Transport and the Environment for the 21st Century*, ed. L.J. Sucharov. Southampton, UK: Computational Mechanics Publications.

Freund, Peter, and George Martin. 1993. *The Ecology of the Automobile*. Montreal, Canada: Black Rose Books.

Gordon, Deborah. 1995. "Sustainable Transportation: What Do We Mean and How Do We Get There?" In *Transportation and Energy: Strategies for a Sustainable Transportation System*, eds. Daniel Sperling and Susan A. Shaheen. Washington, D.C.: American Council for an Energy-Efficient Economy.

Greenest City. 1999. Web site. Http://www.web.net/~greenest/

Gubala, Timothy W. 1995. "The Difference Between Economic Developers and Planners." In *Economic Development in Local Government: A Handbook for Public Officials and Citizens*, ed. Roger L. Kemp. Jefferson, NC: McFarland & Company, Inc.

Gudmundsson, H., and M. Hojer. 1996. "Sustainable Development Principles and Their Implications for Transport." *Ecological Economics* 19:269-282.

Hitchcock, David. 1997. "Transition to Sustainable Development: Is This About Planning?" Presented at the annual meeting of the American Planning Association, San Diego, CA.

Holmberg, Johan, and Richard Sandbrook. 1992. "Sustainable Development: What Is To Be Done?" In *Making Development Sustainable: Redefining Institutions, Policy, and Economics*, ed. Johan Holmberg. Washington, D.C.: Island Press.

Holmes, Henry. 1997. "Just and Sustainable Communities." In *Just Transportation*, eds. Robert D. Bullard and Glenn S. Johnson. Gabriola Island, BC: New Society Publishers.

Hudnut, William H. III. 1999. "Beyond Borders." *Urban Land* (June):20.

Jacobs, Michael. 1993. *The Green Economy: Environment, Sustainable Development and the Politics of the Future*. Vancouver, Canada: UBC Press.

Kidd, Charles V. 1992. "The Evolution of Sustainability." *Journal of Agricultural and Environmental Ethics* 5:1-26

Levine, Jonathan. 1999. "Access to Choice." *Access* (14):16-19.

MacKenzie, James J. 1997. "Driving the Road to Sustainable Ground Transportation." In *Frontiers of Sustainability: Environmentally Sound Agriculture, Forestry, Transportation, and Power Production*, eds. Roger Dower et al. Washington, D.C.: Island Press.

Martin, D.J. 1995. "Solving the Problems Caused by Traffic Saturation of Cities—New Approaches to Mobility." In *Urban Transport and the Environment for the 21st Century*, ed. L.J. Sucharov. Southampton, UK: Computational Mechanics Publications.

Martin, Edward. 1994. "The Urbanizing Carolinas." *Urban Land* (February):28-33.

Matthews, Judith. 1996. "Social Processes and the Pursuit of Sustainable Urban Development." In *Environmental Planning and Sustainability*, eds. S. Buckingham-Hatfield and B. Evans. Chichester, UK: John Wiley & Sons.

Moore, Jennie. 1997. "Inertia and Resistance on the Path to Healthy Communities." In *Eco-City Dimensions: Healthy Communities, Healthy Planet*, ed. Mark Roseland. New Haven, CT: New Society Publishers.

Myerson, George, and Yvonne Rydin. 1996. "Sustainable Development: The Implications of the Global Debate for Land Use Planning." In *Environmental Planning and Sustainability*, eds. S. Buckingham-Hatfield and B. Evans. Chichester, UK: John Wiley & Sons.

National Round Table on the Environment and the Economy. 1997. *State of the Debate on the Environment and the Economy: The Road to Sustainable Transportation in Canada*. Ottawa, ON: The Round Table.

Newman, Peter, and Jeffrey Kenworthy. 1999. *Sustainability and Cities: Overcoming Automobile Dependence*. Washington, D.C.: Island Press.

Nijkamp, Peter. 1994. "Roads Toward Environmentally Sustainable Transport." *Transportation Research—A*. 28A:261-271.

Nozick, Marcia L. 1994. "An Integrated Development Model for Building Sustainable Communities in Canada." In *Community Economic Development*, eds. Burt Galaway and Joe Hudson. Toronto, ON: Thompson Educational Publishing, Inc.

President's Council on Sustainable Development. 1997. *Sustainable Communities Task Force Report*. Washington, D.C.: The Council.

President's Council on Sustainable Development. 1999. *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century.* Washington, D.C.: The Council.

Quinn, Matthew J. 1994. "Land Use Planning to Reduce the Need to Travel." In *Transportation Congress: Civil Engineers—Key to the World Infrastructure*. Washington, D.C.: American Society of Civil Engineers.

Rees, William. 1995. "Achieving Sustainability: Reform or Transformation?" *Journal of Planning Literature* 9:343-361.

Rees, William, and Mathis Wackernagel. 1996. "Urban Ecological Footprints: Why Cities Cannot Be Sustainable—and Why They Are a Key to Sustainability." *Environmental Impact Assessment Review* 16:223-248.

Reid, D. 1995. *Sustainable Development: An Introductory Guide*. London: Earthscan Publications Ltd.

Renn, Ortwin, Rob Goble, and Hans Kastenholz. 1998. "How to Apply the Concept of Sustainability to a Region." *Technological Forecasting and Social Change* 58:63-81.

Replogle, Michael. 1991. "Sustainability: A Vital Concept for transportation Planning and Development." *Journal of Advanced Transportation* 25:3-18.

Ruckelshaus, William D. 1989. "Toward a Sustainable World." *Scientific American* 261:166-170.

Saunders, Todd. 1997. "Ecology and Community Design: Lessons from Northern European Ecological Communities." In *Eco-City Dimensions: Healthy Communities, Healthy Planet*, ed. Mark Roseland. New Haven, CT: New Society Publishers.

Schwab, Anna K., and David J. Brower. 1997. "Sustainable Development: Implementation at the Local Level." *Land Use Law* 49(4):3-7.

Selman, Paul. 1995. "Local Sustainability." *Town Planning Review* 66:287-301.

Shafer, Scott, former president of the Brazos Greenways Council. 1999. Interview by author, 5 August, College Station.

Slocombe, D. Scott. 1993. "Environmental Planning, Ecosystem Science, and Ecosystem Approaches for Integrating Environment and Development." *Environmental Management* 17:289-303.

So, F.S., and J. Getzels. 1987. *The Practice of Local Government Planning, 2nd edition*. Washington, D.C.: The International City Management Association.

Town of Cary. 1996. *Town of Cary Land Use Plan*. Cary, NC: The Town.

Transport Canada. 1997. *Sustainable Development Strategy*. Ottawa, ON: Transport Canada.

Transportation and Climate Change Collaborative. 1995. *A Strategy for Sustainable Transportation in Ontario*. Toronto, ON: The Collaborative.

Transportation Association of Canada. 1993. *A New Vision for Urban Transportation*. Ottawa, ON: TAC.

Transportation Association of Canada. 1997. *TAC Briefing: Financing Urban Transportation*. Ottawa: TAC.

Transportation Association of Canada. 1998. *Achieving Livable Cities*. Ottawa, ON: TAC.

Transportation Research Board. 1997. *Toward a Sustainable Future: Addressing the Long-Term Effects of Motor Vehicle Transportation on Climate and Ecology. Special Report 251*. Washington, D.C.: TRB.

Wilson, Alex, et al. 1998. *Green Development: Integrating Ecology and Real Estate*. New York: John Wiley & Sons, Inc.

Wilson, J.Q. 1989. *Bureaucracy: What Government Agencies Do and Why They Do It.* New York, NY: Basic Books.

Wolkoff, Michael J. 1990. "Economic Development Financing Policy: A State and Local Perspective." In *Financing Economic Development: An Institutional Response*, eds. Richard D. Bingham, Edward W. Hill, and Sammis B. White. Newbury Park: Sage Publications.

World Bank. 1996. *Sustainable Transport: Priorities for Policy Reform*. Washington, D.C.: The World Bank.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford, England: University Press, Oxford.

Yanarella, Ernest J., and Richard S. Levine. 1992. "Does Sustainable Development Lead to Sustainability?" *Futures* 24:759-774.

# APPENDIX A

Oregon's Department of Land Conservation and Development (DLCD)

A Summary of Oregon's Statewide Planning Goals

Oregon's Land Use Program includes 19 statewide planning goals. Cities and counties must adopt comprehensive plans and ordinances which are consistent with these goals. Following is a summary of the statewide planning goals. More detailed information on the goals is available under Statewide Planning Goals.

1. *Citizen Involvement*—Goal 1 calls for "the opportunity for citizens to be involved in all phases of the planning process." It requires each city and county to have a citizen involvement program with six components specified in the goal. It also requires local governments to have a committee for citizen involvement (CCI) to monitor and encourage public participation in planning.
2. *Land Use Planning*—Goal 2 outlines the basic procedures of Oregon's statewide planning program. It says that land-use decisions are to be made in accordance with a comprehensive plan, and that suitable "implementation ordinances" to put the plan's policies into effect must be adopted. It requires that plans be based on "factual information;" that local plans and ordinances be coordinated with those of other jurisdictions and agencies; and that plans be reviewed periodically and amended as needed.

   Goal 2 also contains standards for taking exceptions to statewide goals. An exception may be taken when a statewide goal cannot or should not be applied to a particular area or situation.
3. *Agricultural Lands*—Goal 3 defines "agricultural lands." It then requires counties to inventory such lands and to "preserve and maintain" them through exclusive farm use (EFU) zoning (per ORS Chapter 215).

4. *Forest Lands*—This goal defines forest lands and requires counties to inventory them and adopt policies and ordinances that will "conserve forest lands for forest uses."
5. *Open Spaces, Scenic and Historic Areas, and Natural Resources*—Goal 5 encompasses 12 different types of resources, including wildlife habitats, mineral resources, wetlands, and waterways. It establishes a process through which resources must be inventoried and evaluated. If a resource or site is found to be important, the local government has three policy choices: to preserve the resource, to allow the proposed uses that conflict with it, or to establish some sort of a balance between the resource and those uses that would conflict with it.
6. *Air, Water, and Land Resources Quality*—This goal requires local comprehensive plans and implementing measures to be consistent with state and federal regulations on matters such as groundwater pollution.
7. *Areas Subject to Natural Disasters and Hazards*—Goal 7 deals with development in places subject to natural hazards such as floods or landslides. It requires that jurisdictions apply "appropriate safeguards" (floodplain zoning, for example) when planning for development there.
8. *Recreation Needs*—This goal calls for each community to evaluate its areas and facilities for recreation and develop plans to deal with the projected demand for them. It also sets forth detailed standards for expedited siting of destination resorts.
9. *Economy of the State*—Goal 9 calls for diversification and improvement of the economy. It asks communities to inventory commercial and industrial lands, project future needs for such lands, and plan and zone enough land to meet those needs.
10. *Housing*—This goal specifies that each city must plan for and accommodate needed housing types (typically, multifamily, and manufactured housing). It requires each city to inventory its buildable residential lands, project future needs for such lands, and plan and zone enough buildable land to meet those needs. It also prohibits local plans from discriminating against needed housing types.

11. *Public Facilities and Services*—Goal 11 calls for efficient planning of public services such as sewers, water, law enforcement, and fire protection. The goal's central concept is that public services should be planned in accordance with a community's needs and capacities rather than be forced to respond to development as it occurs.
12. *Transportation*—The goal aims to provide "a safe, convenient, and economic transportation system." It asks for communities to address the needs of the "transportation disadvantaged."
13. *Energy*—Goal 13 declares that "land and uses developed on the land shall be managed and controlled so as to maximize the conversation of all forms of energy, based upon sound economic principles."
14. *Urbanization*—This goal requires all cities to estimate future growth and needs for land and then plan and zone enough land to meet those needs. It calls for each city to establish an "urban growth boundary" (UGB) to "identify and separate urbanizable land from rural land." It specifies seven factors that must be considered in drawing up a UGB. It also lists four criteria to be applied when undeveloped land within a UGB is to be converted to urban uses.
15. *Willamette Greenway*—Goal 15 sets forth procedures for administering the 300 miles of greenway that protects the Willamette River.
16. *Estuarine Resources*—This goal requires local governments to classify Oregon's 22 major estuaries in four categories: natural, conservation, shallow-draft development, and deep-draft development. It then describes types of land uses and activities that are permissible in those "management units."
17. *Coastal Shorelands*—The goal defines a planning area bounded by the ocean beaches on the west and the coast highway (State Route 101) on the east. It specifies how certain types of land and resources there are to be managed: major marshes, for example, are to be protected. Sites best suited for unique coastal land uses (port facilities, for example) are reserved for "water-dependent" or "water-related" uses.

18. *Beaches and Dunes*—Goal 18 sets planning standards for development on various types of dunes. It prohibits residential development on beaches and active foredunes, but allows other types of development if they meet key criteria. The goal also deals with dune grading, groundwater drawdown in dunal aquifers, and the breaching of foredunes.
19. *Ocean Resources*—Goal 19 aims "to conserve the long-term values, benefits, and natural resources of the nearshore ocean and the continental shelf." It deals with matters such as dumping of dredge spoils and discharging of waste products into the open sea. Goal 19's main requirements are for state agencies rather than cities and counties.

## APPENDIX B

# BRIEFING

Transportation Association of Canada Association des transports du Canada Reprint November 1998

# A NEW VISION FOR URBAN TRANSPORTATION

In 1993 the TAC Urban Transportation Council first published this **New Vision for Urban Transportation**. It proposes a 30 year generic vision for Canadian urban areas that can be tailored to fit to local conditions. The vision is supported by 13 decision making principles which point the way to a more desirable future. They call for significant change from past practices in terms of land use and urban structure, the role of single occupant autos relative to other modes, and transportation funding.

Since its publication, the vision has been endorsed by a variety of local governments as well as provincial and national organizations (see the box on page 6), and its principles are starting to appear in the latest municipal plans. The vision has been cited by the Organization for Economic Cooperation and Development as an example of “best thinking on environmentally sustainable transportation in Canada”. The National Round Table on the Environment and the Economy, has called it “perhaps the most influential (sustainable transportation) vision statement currently in Canada”.

Today, municipal leaders are challenged with delivering livable and sustainable cities in the face of shrinking resources. Since transportation pervades almost every aspect of urban life, it is part of the challenge and must be part of the solution. In that regard, the vision and its principles still provide a valid guide. Therefore this reprint of the original 1993 briefing is offered as a service to all who share in the responsibility for tomorrow’s urban transportation systems.

## CURRENT TRENDS ARE LEADING TO URBAN TRANSPORTATION SYSTEMS WHICH DO NOT MEET NEEDS AND ARE NOT SUSTAINABLE…

Urban areas exist to serve the economic and social needs of their residents. Transportation is essential to meet those needs because it both serves and helps shape urban development.

The wealth of nations is largely generated in cities and will become more so in the new high technology, information based, globally competitive economies of the future. Urban transportation systems will have to be very productive, efficient, cost effective and accessible to allow cities to generate the wealth needed for quality of life improvements, social services, infrastructure, environ-mental protection and transportation itself. To achieve that goal will require new approaches to land use, urban design, transportation planning and financing. Continuation of current trends will not work.

**Land Use and Urban Design**

Past practice has been to divide cities into homogeneous, single use areas of relatively low density. Streets are seldom pedestrian friendly. Cyclists and goods carriers must usually make do with whatever roadway space is available. Shopping malls are far from home or work and require large areas, mostly for parking. Suburban or bedroom communities are designed for single family houses with large lots on cul-de-sacs or winding roads.

The result of such practice is to increase auto travel and maximize travel distances. For the majority of urban residents the auto is not a luxury, but a necessity to move between home, work, shopping, schools, recreation, etc. In most cases walking, cycling and even transit are not viable options. Overwhelming dependence on the private automobile contributes to urban sprawl, losses in prime farmland, excess consumption of fossil fuel, air and noise pollution, and traffic congestion.

**Transportation**

Per capita automobile ownership is increasing and the average number of occupants per auto is decreasing. Transit serves only a small percentage of total demand and in some

areas its market share is decreasing. Trucks are forced to stand in traffic lanes because in many cases off-street loading facilities are not provided. Goods distribution is seldom considered as part of the total urban transportation system; nor is parking usually planned and coordinated to be part of the solution. The potential for cycling cannot be fully realized without special provisions for sharing road-space. Under heavy traffic loads, roadways and bridges are wearing out faster than they can be repaired with present maintenance budgets. Land and money for new road construction are becoming scarce.

Traffic congestion, inefficiencies and added costs of present transportation systems are becoming economic, financial and social liabilities for the whole urban area. Cities are less able to compete domestically and internationally. Deferred maintenance is always more costly. Families spend more time on the road and less time together. People are exposed to greater health risks.

**Financing**

Municipal and provincial budgets have been the traditional sources of financing urban road construction and maintenance as well as transit subsidies. Federal transfer payments to the provinces and provincial grants to municipalities are decreasing relative to needs as a result of recession, a weak economy, government debt service charges and other factors.

Municipalities are faced with increasing costs for social and other services, decreasing revenue and citizen resistance to higher taxes. Something has to give, and it is often the municipal transportation budget.

**TO PROVIDE TRANSPORTATION SYSTEMS THAT TO BETTER SERVE THE ECONOMIC AND SOCIAL NEEDS OF URBAN RESIDENTS AND PROTECT THE ENVIRONMENT, A NEW VISION IS NEEDED…**

**A Generic Transportation Vision**

This BRIEFING proposes a generic urban transportation vision suitable for large and medium sized urban areas in Canada. The vision is supported by a series of principles or directions, designed to change past trends and result in future cities that are more:
• economically competitive
• socially desirable
• environmentally friendly and allow:
• greater mobility
• easier access to a wider choice of transportation options
while recognizing:
• economic realities
• the constraints of the existing urban structure.

First and foremost among these principles is the need to change land use and urban design practices. Achieving this part of the vision will therefore require a long term program of gradual change.

**Unique Local Transportation Visions**

With the generic vision as a starting point, each urban area is encouraged to develop its own unique urban transportation vision by adapting the principles to reflect local conditions. Specific visions will differ among urban areas reflecting their different sizes, land constraints, development patterns, densities, growth rates, etc.

**Urban Area Visions**

Each specific transportation vision should be developed within the context of an overall urban area vision – defined by an urban development plan with complementary design objectives. That plan should be rooted in reality while offering adequate lifestyle choices; it should distinguish between real needs and less essential “wants” when allocating re-sources. It must strike a balance between the requirements of the community, the economy and the environment. Compatibility between land use and transportation is central to that balance. Therefore, while transportation is a major part of an urban area vision, the urban vision is much broader.

**The Need for Cooperation and Leadership**

What kind of urban areas do we want to see in the future? The generic urban transportation vision in this BRIEFING is based on the belief that a more compact form of urban development is more desirable than a less compact form in order to:
• protect and enhance the environment
• conserve natural resources including energy and land
• provide a wider and more balanced choice of accessible and affordable transportation services
• better response to the needs of the majority of residents.

This form of development represents a significant departure from past practice. To achieve it will require the active cooperation of many interest groups. **Political leadership, based on informed public support, will be critical.**

# A GENERIC VISION FOR URBAN TRANSPORTATION

*It is the year 2023:*

- A long term urban development plan has been approved. It emphasizes multi use town centres and high density, mixed use along connecting corridors. Transit has funding and operating priority in those corridors.
- Short-medium term community/neighbourhood plans have been approved. They emphasize compact, mixed use communities based on pedestrian, cycling and transit friendly design.
- Transit, highways, arterials, parking and truck routes are planned and coordinated across the urban area.
- The percentages of trips made by walking, cycling, transit and high occupancy automobiles are all increasing; the percentage of trips made by single occupant automobiles is decreasing.
- The average distance and time for peak hour commuter travel is decreasing.
- An area wide parking strategy is in place and enforced.
- There are very few places which still require on-street goods transfer.
- The physically challenged enjoy universal access to public transport facilities and services.
- Roads and bridges are in a good state of repair.
- Air pollution from motor vehicle sources is declining.
- Urban transportation infrastructure and services are adequately funded from stable and sustainable revenue sources.
- Political leaders have the support of a well informed public when making decisions on urban development and transportation systems to serve the area.

**DECISION MAKING PRINCIPLES POINT THE DIRECTION TO FUTURE CHANGE…**

**1. Urban Structure and Land Use**

**Plan for increased densities and more mixed land use**
This principle will reduce dependence on the private auto, shorten trip lengths and encourage modal shifts to walking, cycling and transit. It can be applied at both the macro scale (the whole urban area) and the micro scale (neighbourhood and communities within the urban area). It includes techniques such as intensification, infill and neo-traditional urban design.

The **method at the macro scale** requires the creation of a long term **urban development plan** (30 to 50 years) to provide a context for future growth. The plan should blend economic, social and environmental aspirations, and integrate land use and transportation into a coherent whole. **Elements** of the plan may include: • development of major multi use town centres in suburban areas, integrated with regional transit.

- high density, mixed use development along major transit corridors.
- transit funding and operating priority where densities and demand levels make this possible.
- a grid pattern of highways and arterials to accommodate truck traffic and passenger demand that cannot be handled by walking, cycling or transit.

**Methods at the micro scale** require the creation of short to medium term **community/neighbourhood plans** (5 to 10 years) to provide direction to decision makers on development applications. **Elements** may include:

- development of more compact, mixed use communities offering a range of housing types, with pedestrian friendly urban design as a prime objective.
- reurbanization of municipal core areas.
- a transit friendly grid pattern of local streets.
- pedestrian, cycling, transit and truck friendly designs including sidewalks and footpaths, cycle lanes and paths, higher densities close to transit stops and off street loading.

For further details on these subjects see Reference 1.

**2. Walking**

**Promote walking as the preferred mode for person trips.**
Walking is a part of every person trip. Increased walking is healthy, environmentally friendly, and reduces demand on road and transit systems. The goal is to improve the quality of the walking environment through pedestrian friendly streetscapes and make walking a more attractive choice. **Methods** include:

- increased densities and mixed land use to bring origins and destinations closer together.
- design of public rights-of-way to encourage pedestrian use and not just motor vehicle use (e.g.: adequate provision and maintenance of inter-connected sidewalks and foot paths).
- protection from inclement weather.
- adequate lighting for safety and security.
- accessibility for the physically challenged.
- street level establishments close to the sidewalk.

**3. Cycling**

**Increase opportunities for cycling as an optional mode of travel.**

Cycling is part of a total urban transportation system and, like walking, is healthy and environmentally friendly. Increased opportunities for safe cycling can best be achieved through urban and community plans, and through provision of facilities. **Methods** include:

- cycle lanes on the public right-of-way and separate cycle networks.
- the needs of cyclists considered in the preparation of community/ neighbourhood plans.
- storage facilities at transit stations and on transit vehicles to encourage bike and ride.
- storage facilities in the downtown core, suburban town centres, and other key locations.
- provision of cycle facilities as a condition of development.

**4. Transit**

**Provide higher quality transit service to increase its attractiveness relative to the private auto.**

More attractive service and increased market share for transit are essential elements in achieving this vision. Better transit can reduce reliance on the single occupant automobile. Current demographics, existing urban designs and funding requirements make this a challenging goal, but many things can be done – especially if improvements are aimed at specific market segments (see Reference 2).

The **key method** lies in new urban structure and land use planning approaches as described in Principle #1 above. **Other methods** include:

- develop a hierarchy of transit services (primary on controlled access ways, secondary on exclusive bus lanes or HOV lanes, a feeder network and auxiliary facilities such as park-and- ride).
- give transit funding and operating priority (e.g.: transit or HOV lanes).
- improve comfort, security, frequency, on time reliability, geographic coverage, access for the physically challenged, and public information services.
- encourage park-and-ride, kiss-and-ride and bike-and-ride by providing appropriate facilities.
- integrate transit stations, schedules and fares in areas with more than one transit system.
- introduce preferential income tax treatment for transit use (e.g.: make employer provided transit passes a non-taxable benefit).

**5. Automobile**

**Create an environment in which automobiles can play a more balanced role.**

The private automobile is the dominant mode of urban transportation and will remain so for the foreseeable future. Current urban structures and land use practices, coupled with the comfort, security and convenience of the auto make this inevitable. However, inefficient auto uses (e.g.: single occupant vehicles to destinations served by transit) should be reduced, and a more balanced transportation system could be achieved through a combination of **methods**:

- reduce travel demand by bringing origins and destinations close together through higher densities and mixed land use.
- design new suburbs, major developments and redevelopments to be more walking, cycling and transit friendly.
- employ traffic management techniques (including HOV lanes) to achieve more efficient use of roads.
- encourage flexible working hours and ride sharing programs.

**6. Parking**

**Plan parking supply and price to be in balance with walking, cycling, transit and auto priorities.**

Parking is an important part of the transportation infrastructure and its provision should be coordinated throughout the urban area much like roads or transit. It is critical to the financial health of retail activities and can complement public transit. In order to make parking part of the solution to traffic congestion problems, it must be both planned and controlled.

The **key method** is to develop a comprehensive on-street/off-street parking strategy including short term, long term, park-and- ride, public and private, supply and price considerations. **Elements** of that strategy may include:

- detailed studies to determine current and future parking supply and demand.
- emphasize short stay over long stay parking downtown.
- on-street parking priced at a higher rate than off-street.
- on-street parking limited to off-peak periods.
- off-street neighbourhood parking structures incorporating retail and commercial uses.
- park-and-ride facilities integrated with the transit system.
- municipal enforcement to ensure a balance of parking supply with demand.

**7. Goods Movement**

**Improve the efficiency of the urban goods distribution system.**

Efficient goods movement is vital to the economic health and competitiveness of an urban area, but at present many inefficiencies exist. Added costs are passed on to truckers in the form of decreased profits, to consumers through higher prices and to the

public with increased congestion. **Methods** to improve goods movement efficiency include:

- cooperative efforts by the trucking industry to give municipalities a better understanding of how to meet industry needs.
- consideration by municipal authorities of the total goods distribution system in all stages of urban planning and development (i.e.: urban development plan, community/neighbourhood plans, site development plans).
- require off-street loading facilities or zones for all new developments.
- encourage industry to make more use of consolidated delivery services to congested areas.
- improve the truck route network through designated routes, better road geometrics, stronger pavement, etc.

**8. Inter-Modal Integration**

**Promote inter-modal and inter-line connections.**

Each mode and each carrier – whether for passengers or goods – should be conveniently integrated with the rest of the urban transportation system. Special planning efforts are required to achieve this. Benefits include more attractive transit services and more efficient goods movement. **Methods** include:

- in the urban development plan, design the location of transit connections to be quick, easy and weather protected.
- in community/neighbourhood plans and site developments, minimize walking distances to transit.
- promote gateway/mobility centres.
- integrate fares and services between transit systems.
- consider inter-city links in developing urban area terminals for passengers and goods.

**9. New Technology**

**Promote new technologies which improve urban mobility and help protect the environment.**

New technologies can be used to reinforce desirable changes advocated in this vision. Some **examples** are:

- telecommunications, to reduce peak period travel demand and lessen the strain on the road system.
- Intelligent Vehicle Highway Systems and computerized signal control, to increase the efficiency of existing road systems.
- vehicle locating systems, to allow for demand responsive transit.
- enhanced pollution control equipment and standards for all motor vehicles, to slow the increase in air pollution.
- fuel substitution and increased fuel efficiency.

**10. System Optimization**

**Optimize the use of existing transportation systems to move people and goods.**

Improving urban mobility requires a determined effort to make the most of the expensive transportation infrastructure already in place. Minor modifications (lane widening, turning bays, etc.) may be appropriate, but very expensive items (new freeways, bridges tunnels, mass rapid transit, etc.) will have to wait in favour of cheaper options with better payoffs. **Methods** include:

- treat the road system as a multi use public facility which recognizes the needs of pedestrians, cyclists, transit, high occupancy vehicles, autos and trucks.
- make operational improvements through transportation management.
- promote ways to flatten traffic peaks and shift modes through demand management.
- enhance transit services.
- implement supportive parking policies.

**11. Special User Needs**

**Design and operate transportation systems which can be used by the physically challenged.**

The number of physically challenged persons will grow in the future as the population ages. Transportation services must be accessible to them. **Methods** include:

- use low floor transit vehicles.
- provide cost effective para transit services (see Reference 3 for an example).
- establish by-laws for minimum numbers of off-street parking stalls for the physically challenged.
- use curb cuts, ramps and other designs to improve access.
- provide for special vehicle access in parking structures.

**12. Environment**

**Ensure that urban transportation decisions protect and enhance the environment.**

The two largest sources of air pollution in most Canadian urban areas under normal conditions are motor vehicle emissions and space heating. Improvements in air quality from reduced motor vehicle emissions can be achieved provided there is a determined effort to do so. The first ten principles in this vision all work toward that end. The goal is to strengthen these trends and build environmental considerations into every stage of decision making. **Methods** include:

- develop environmental codes of practice based on a national environmental policy (Reference 4).
- require environmental considerations to be an integral part of the urban development plan, community/neighbourhood plans and site development approvals.
- give funding priority to the most environmentally friendly transportation options.
- consider mandatory regular inspections of motor vehicle emission control systems.
- encourage the development and use of environmentally friendly power sources for vehicles.

**13. Funding/Financing**

**Create better ways to pay for future urban transportation systems.**

Realistic means must be found to provide adequate and sustaining sources of funds for new, expanded and properly maintained urban transportation infrastructure and services. Current funding/financing mechanisms do not meet this need. Funding should be:

- stable over time.
- predictable in magnitude.
- "transparent" (open and easily understood by decision makers and the public).
- increasingly derived from users in proportion to benefits received.
- dedicated by law to urban transportation system enhancements.
- designed to foster an urban transportation system operating at the lowest possible total cost.

There are various options for achieving these funding goals. Differing perceptions surround each, and no consensus has yet emerged. Some suggested **methods** include:

**Redistribution of existing taxes.** Some believe that taxes currently levied on the transportation sector could substantially help meet funding needs if they were allocated or dedicated to transportation rather than being treated as general revenues. The federal excise tax on motor vehicle fuel is often cited in this context. Others suggest that it is unrealistic to propose such a fundamental change in government tax policy.

**New taxes.** Dedicated fuel taxes, licence fee surcharges and frontage levies are proposed by some as ways to raise money for urban transportation. Others argue that these are blunt instruments that do little to encourage more efficient travel behaviour, and that existing tax revenues should be more equitably distributed before new taxes are imposed.

**Roadway pricing.** Proponents say that this can raise money, flatten demand peaks, encourage modal shifts and lead to more efficient use of roadways. Opponents say that roadway pricing is a punitive measure against private motorists who believe they already pay their fair share.

Although opinions vary on the best funding methods, there is widespread agreement that money must be spent wisely on improved urban transportation systems, and that benefits (less congestion, improved mobility, greater efficiency) will outweigh costs.

**POLITICAL LEADERSHIP, SUPPORTED BY AN INFORMED PUBLIC, IS NEEDED TO MOVE AHEAD…**

Creating and implementing a new urban transportation vision will be an institutional and social challenge, requiring the cooperative efforts of all key players. The final vision will naturally be a compromise – a balanced blending of the often conflicting goals and aspirations of many vested interest groups.

**Someone must take the lead in this process and it is logical that municipal elected officials do so.** They should be supported and encouraged by the appropriate provincial departments and their own urban planning and transportation professional staffs.

Several changes to current institutional arrangements and practices may be required to develop and implement the new vision:

- Most municipal departments are structured on vertical lines (planning, transportation, transit, sewer, water, etc.). New methods for horizontal communications may be needed.
- Where more than one municipality or more than one level of government has jurisdiction in an urban area, a mechanism will be needed to coordinate and integrate their efforts across the region, at least for planning purposes.
- Public education will be a major key to success. Without it political leaders will not have the mandate to move in the right direction. This can be a very time consuming and expensive exercise, but it is necessary.
- Checks must be built into the decision making process, to ensure that day-to-day decisions are compatible with the vision and its principles.

**References:**


1. Transit – Supportive Land Use Planning Guidelines, Ontario Ministries of Transportation and Urban Affairs, April 1992, ISBN 0-7729-9734-9
2. Modal Shift to Transit Project, Canadian Urban Transit Association, 1992
3. Demonstration Project: DATS Brokerage Revisited, Edmonton Transit, 1989
4. Environmental Policy and Code of Ethics, Transportation Association of Canada, 1992.


**THE FUTURE…**

For the past 18 months the TAC Urban Transportation Council has carefully considered the most practical means of ensuring that future transportation systems:

- are more accessible and increase mobility.
- reduce pollution, frustration and waste.
- make the best use of available re-sources.
- support the development of urban areas that are economically competitive and socially desirable.

A NEW VISION FOR URBAN TRANSPORTATION is its answer. The vision approach calls for a long term but meaningful program of action and change – one which is beyond the scope of the Council to implement.

However, the Council's mandate does allow it to act as a catalyst, to provide a forum, to help the responsible parties work together toward common goals. The TAC Urban Transportation Council is prepared to do this in the months and years ahead. Your participation will be encouraged and welcome.

***ENDORSEMENTS FOR THE VISION***

**Local**

- Halifax Regional Municipality
- Regional Municipality of Ottawa-Carleton
- Municipality of Metropolitan Toronto
- Regional Municipality of York
- Regional Municipality of Hamilton-Wentworth
- City of Regina
- Greater Vancouver Regional District
- District of Saanich

**Provincial**

- Association of Municipalities of Ontario
- Saskatchewan Urban Municipalities Association
- Ontario Transportation and Climate Change Collaborative

**National**

- Federation of Canadian Municipalities
- Transportation Association of Canada
- Canadian Institute of Planners
- Canadian Institute of Transportation Engineers
- Canadian Urban Transit Association

**TAC is a national, multi-modal, multi-jurisdictional organization promoting the provision of safe, efficient, effective and sustainable transportation services in support of Canada's social and economic goals.**

This Briefing was prepared by the TAC sponsored **Urban Transportation Council** and assembled by **John Hartman**, Council Secretary and member of the TAC Secretariat staff. 

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