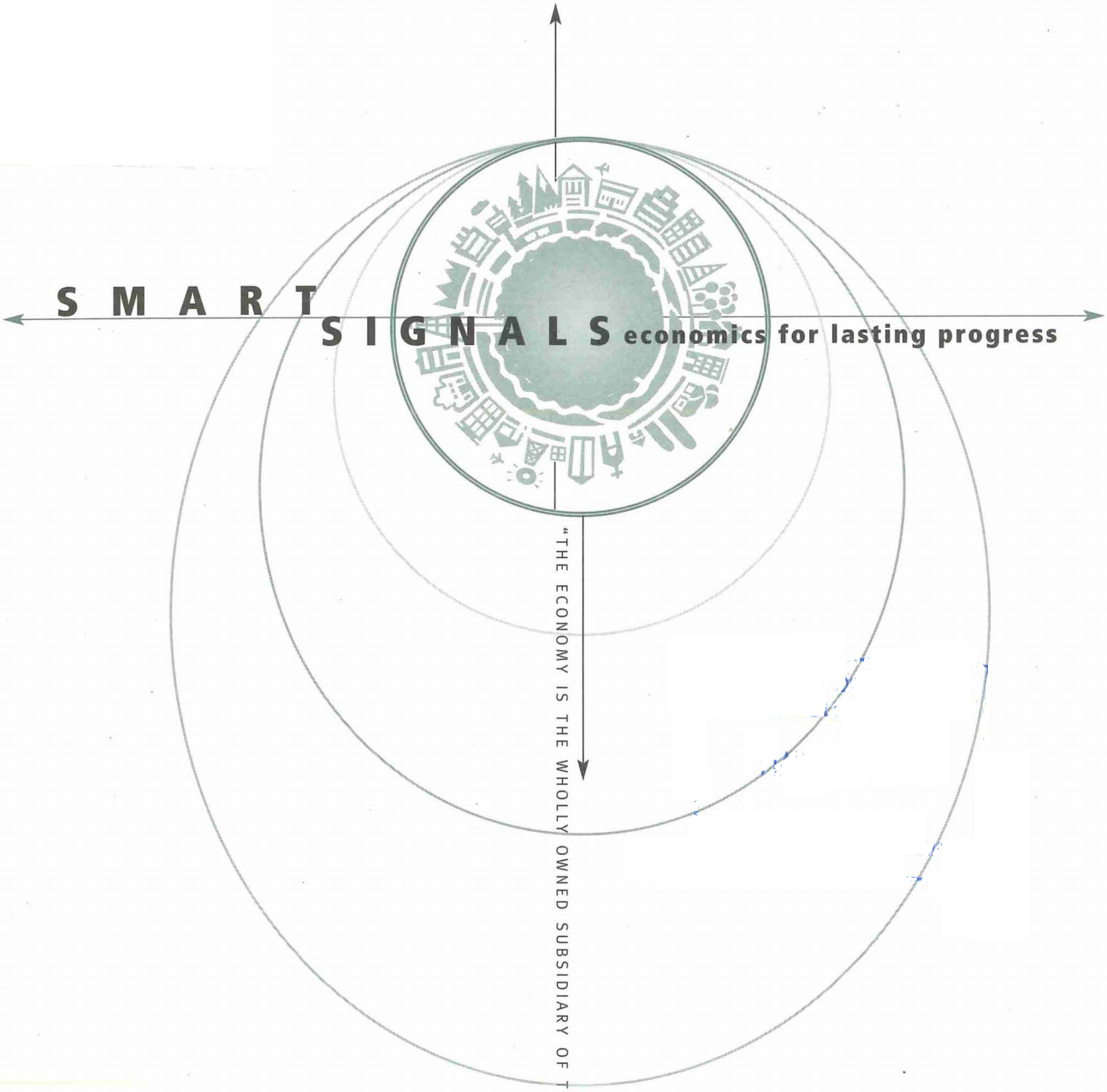
MINNESOTA PLANNING ENVIRONMENTAL QUALITY BOARD



SMART SIGNALS economics for lasting progress

"THE ECONOMY IS THE WHOLLY OWNED SUBSIDIARY OF THE ENVIRONMENT." — GAYLORD NELSON

NOVEMBER 1999

The Environmental Quality Board, staffed by Minnesota Planning, draws together five citizen members and the heads of 10 state agencies that play a vital role in Minnesota's environment and development. The board develops policy, creates long-range plans and reviews proposed projects that would significantly influence Minnesota's environment. The Environmental Quality Board coordinates the Minnesota Sustainable Development Initiative, a collaboration of business, government and civic interests to promote policies, institutions and actions that ensure Minnesota's long-term environmental, economic and social well-being.

Minnesota Planning is charged with developing a long-range plan for the state, stimulating public participation in Minnesota's future and coordinating public policy among state agencies, the Legislature and other units of government.

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Upon request, copies of *Smart Signals: Economics for Lasting Progress* will be made available in an alternative format, such as Braille, large print or audio tape. For TTY, contact Minnesota Relay at 800-627-3529 and ask for Minnesota Planning.

SMART SIGNALS economics for lasting progress

Summary and overview 1

Measuring what counts for a healthy economy 9

Connecting corporate subsidies with environmental citizenship . . . 25

Ensuring clean, safe and reliable transportation 31

Making home heating affordable 39

Developing a certified wood industry 47

Making the property tax work for smart growth 59

Sending clear signals for air pollution control 77

Glossary . . . . . inside back cover

Summary and overview

Should state tax policy discourage urban redevelopment and smart growth? When a company reduces its air emissions, should the fees it pays for each ton of pollutants increase? Should state and local governments ignore a company's environmental performance when providing economic aid?

The answers to these questions lie in Minnesota's tax laws and incentive programs. And, as current laws stand, the state has answered yes in all three cases. But do these policies truly reflect the long-term interests of Minnesotans?

Perhaps not. But, if nothing else, these three examples show how Minnesota laws and policies often send mixed economic signals. The manner in which tax revenues are collected is frequently at odds with how tax dollars are spent. Consider the state's land use policy.

Currently, Minnesota's property tax system penalizes urban landowners for improving property. That, in turn, discourages redevelopment and encourages sprawl. At the same time, policy-makers spend millions of dollars to develop urban renewal plans, build affordable housing and subsidize downtown revitalization.

A similar situation exists with the way government and society measure economic progress. The gross national product, which started as a measure of our nation's productivity, is now commonly interpreted as a measure of our national economic health and welfare. Yet the gross national product and Minnesota's own version of it — the gross state product — count economic activity in cleaning up spills, crime and divorce as positive outcomes. The increased cost of auto repairs due to vandalism or accidents and the growing expense of brownfields cleanup should not be considered progress.

> *We need common-sense incentives for making smart decisions, and consequences, when necessary, for making short-sighted ones.*
> — Governor Jesse Ventura

Indeed, few Minnesotans would say that the growth of the economy at the expense of the state's natural environment and community welfare is the path to take.

Minnesota can support lasting prosperity if state policy reflects clear goals, policy incentives are aligned with the goals, and progress is monitored with respect to the goals. The purpose of the Economics for Lasting Progress project is to find ways to improve the economic signals contained in state policy and to identify new measures of economic progress which reflect social and environmental goals.

Progress and problems

Smart Signals applied five principles, described on the following page, to a series of state programs and policies. Here is what this analysis found:

Minnesota is doing many things well, but some tax and spending policies work at cross-purposes. Minnesota government collects vital information, examines the effects of policy and ensures that families can meet their basic needs. The problem is that many of these efforts operate in relative isolation while other forces undermine them, thereby decreasing their effectiveness.

A good example is the state's economic development process. State and local authorities give economic aid to attract employers and jobs, but do not consider the environmental records of the businesses they help. As a result, government may be

spending money at both ends of the process: first to stimulate new jobs, and then to clean up any pollution created by those publicly subsidized employers. But, perhaps more importantly, the opportunity to provide businesses with the information and assistance they need to improve their environmental performance is lost. It may be more cost-effective in the long run to only encourage business development that is compatible with environmental and community health.

Another example is the property tax. Many state and local programs address such urban growth issues as sprawl, affordable housing and urban redevelopment. But the current property tax structure encourages land value inflation — a principal cause of the housing affordability problem in the metropolitan area. It also sends economic signals which discourage the efficient use of land and urban infrastructure and discourage property redevelopment and improvement.

Our current revenue system relies heavily on a patchwork of tax incentives, rather than a coherent policy framework based on economic efficiency. A "tax expenditure" is a provision in law which limits the tax burden on taxpayers in certain situations. Our current revenue system features nearly 400 tax expenditures designed to protect various interests or promote social outcomes. The problem is that often such programs, despite their worthy intentions, end up having long-term negative consequences. Changing the policy, however, becomes difficult because once these programs are established by statute, they continue without review. In contrast, direct expenditures are open to scrutiny every two years as part of the state budget process.

Tax expenditures also have unintended ripple effects. The Minnesota property tax system subsidizes certain property owners. This in turn creates development problems and forces trade-offs, such as between supporting home ownership and providing affordable rental housing. These trigger more government programs and new tax policies to deal with the fallout. This cycle is expensive and ultimately not sustainable.

Some state incentives have become divorced from their ultimate policy objective. When the state focuses on the means to an end, rather than the

PRINCIPLES FOR REFORMING GOVERNMENT SIGNALS

Smart Signals offers suggestions for rethinking and reframing economic policies to correct errant signals. A few common sense principles can help guide the way. Government policies and programs should address principles of:

Efficiency: Remove economic distortions in public policy. These create unintended social, economic and environmental problems for the state. Ensure that proposed solutions reflect the least cost solution over the long term, taking into account environmental and social, as well as economic, costs.

Accountability: Create a context in which the true costs and consequences of development are born by the beneficiaries; make sure programs are evaluated on how they affect the economy, the environment and community quality of life.

Consistency: Establish policies and programs that do not work at cross-purposes with each other and establish continuity in policies across all levels of government.

Interdependency: Acknowledge the economic, social and environmental consequences of policy options and recognize that they are linked.

Equity: Ensure equal opportunity of citizens and businesses to participate in the economy.

ultimate goal, policies lose their relevance and fail to send the right signals.

For example, with regard to home heating, the state subsidizes the price of heating fuel through a tax exemption. The intent is to ensure that people can afford to heat their homes in winter. The current policy is one particular means to that end. While this policy made sense in 1978, advances in the effectiveness of energy conservation technologies and decreasing prices of these technologies have changed the picture. Now, 20 years later, the state could achieve long-term, affordable home heating for less money by motivating property owners to install energy efficient technologies.

Taxing gasoline to fund highway construction and maintenance is another example. The connection between gasoline and road use is valid, but weakens as vehicles become more fuel efficient. As a result, the demand for new roads and the need for maintenance are increasing faster than our ability to pay for them.

Instruments to measure progress are in place, but give only part of the picture. Minnesota already has one measure of economic prosperity, the gross state product, but this measures only economic activity. Measures such as the unemployment rate and growth in median income are limited in scope. Basing decisions solely on individual indicators that do not provide a comprehensive view can lead to misguided decisions.

Major recommendations

Smart Signals produced a number of recommendations, and several major themes emerged. These are:

Take advantage of the marketplace as a tool when adopting public policy goals. The market can be an efficient and powerful force for furthering public policy goals, but state policy must send the right signals to businesses and households. In many cases, the market, thus modified, can achieve public policy goals efficiently and equitably.

Focus first on removing the mixed signals in existing policies before funding new programs or initiatives. The state should start new programs or initiatives only after efforts have been made to remove the economic distortions in existing policies. Otherwise, the state spends taxpayer dollars to address symptoms, not causes.

Re-evaluate incentive programs so that incentives work toward achieving the goal of a healthy, sustainable economy in the most effective way possible. Some current incentives encourage a means that may no longer be the most efficient or effective way of achieving this goal.

Develop a new tool to measure and evaluate Minnesota's progress toward a healthy economy. Minnesotans care deeply about leaving their grandchildren a bright future — a strong economy, a healthy environment and robust, vital communities. Needed is a new measure which tells Minnesotans whether progress is being made. The state should adopt this new measure of progress, the "Minnesota progress indicator," and use it to evaluate how we are doing and to point out where we can do better.

Develop new tools to evaluate economic development grants and loans. Minnesota spends a significant amount of money to encourage businesses to create or retain jobs. In some cases, tax payers may pay twice for these jobs — offering money to attract and retain businesses with one hand, and paying to clean up environmental damages with the other. Minnesota needs a system that coordinates economic development with long-term environmental and community performance.

These recommendations are designed to move Minnesotans toward the goal of sustainable development. The following framework, goals and

objectives for a healthy Minnesota are based on the recognition that environmental, economic and social conditions are intertwined.

Describing a healthy economy

"Economics" — from the Greek "eco" meaning "house or habitat" and "nomos" meaning "management"

It is easy to forget what economics is all about. As the etymology reminds us, it is not about abstract trade statistics or commercial transactions, but literally means "the management of the household." Ensuring that requirements of the "household" at all levels — home, city, state, country, world — are met and sustained is the goal of economics. The basic task of any economy is really the continuation and advancement of life, although few people think of it that way. So commerce is only one dimension of the economy. Education, housing, environmental protection, personal security and many other issues are critical to successful "household management."

We often talk about our economy as though it were a self-contained entity — separate from the people who have created it and who make it work, and separate from the physical world in which it exists. In fact, our economy's riches flow directly from the natural world and its wastes go back to the environment. Our economy is a creature of our society and is fundamentally bound up with the fate of both people and nature.

To create a healthy, *sustainable* economy, we must produce goods and services, create financial wealth *and* operate in ways that improve people's lives and the health of our environment. That means that improvements in one area — economic, environmental or social — cannot come at the expense of the other two. A sustainable economy is not so much about balancing or trading off the environment against the economy, or the economy against the community. Instead, it is seeking to improve all three simultaneously.

The fact that environmental, economic and social conditions are intertwined also means that the states that do the best job of investing in all three have the best chance of securing the highest quality of life for citizens. Evidence suggests, for example, that states doing the most to protect natural resources also have the strongest economies and best jobs. A stronger economy, in turn, should mean less poverty, less crime and better living conditions for more people. These are the goals of a sustainable economy.

Goals and outcomes of a healthy, sustainable economy

To achieve our vision of sustainable development, some things must grow — jobs, productivity, wages, capital and savings, profits, information, knowledge, and education — and others — pollution, waste, and poverty — must not.
— Sustainable America: A New Consensus

A sustainable economy replenishes its environment as it supports citizens and their communities. It is meeting our needs today *and* leaving things as good as or better than we found them.

In 1992, thousands of Minnesotans identified a vision for a healthy economy as part of *Minnesota Milestones*, a set of state progress measures which were updated in 1998. In addition, the Minnesota Round Table on Sustainable Development, a group convened by the governor, described the outcomes of a sustainable economy in *Investing in Minnesota's Future*. Together, these ideas present a picture of what most Minnesotans would like to create and pass on to their children and all future generations. These goals are:

Goal 1: Minnesota will have sustainable, strong economic development.

Economic growth creates jobs and may increase opportunities for better jobs and improved living standards. Growth may aid progress toward other Minnesota Milestones goals but does not guarantee it. The use of the word "sustainable" in this goal reflects Minnesotans' belief that economic growth and environmental protection should be complementary objectives. The term also conveys Minnesotans' belief that long-term growth is a higher goal than short-term growth. — Minnesota Milestones 1998: Measures That Matter

To achieve sustainable outcomes, Minnesotans and their economy should:

- Have a diverse mix and geographic distribution of businesses.
- Create a business climate that fosters entrepreneurship and profitability through resource productivity and operational efficiency and that encourages business to invest in communities and the environment.
- Provide sufficient infrastructure and public services to encourage efficient business and community development and protect public health and the environment.
- Efficiently transform natural resources, energy, waste, knowledge, information and skills into goods and services.

Goal 2: All Minnesotans will have the means to maintain a reasonable standard of living.

Economic growth provides a foundation for economic prosperity but does not ensure a better standard of living for all Minnesotans. The citizens who helped create Minnesota Milestones stated clearly that living slightly above the poverty level is not adequate for a reasonable standard of living. — Minnesota Milestones 1998: Measures That Matter

To achieve sustainable outcomes, Minnesotans and their economy should:

- Produce a highly skilled work force that meets business and community needs.
- Produce jobs that provide people with sufficient wages to meet basic needs and contribute to society.
- Provide fair and affordable access to jobs, education, transportation, health care and other basic services.
- Fairly place costs for services on individuals and groups that benefit, and account for impacts on future Minnesotans.

Goal 3: Rural areas, small cities and urban neighborhoods throughout the state will be economically viable places for people to live and work.

Many of the people from around the state who helped create Minnesota Milestones expressed the strong desire that they and their children continue to be able to live in their community. Economic opportunity heavily influences where people choose to live. — Minnesota Milestones 1998: Measures That Matter

To achieve sustainable outcomes, Minnesotans and their economy should:

- Encourage locally owned and controlled businesses and local production of goods and services that adds value to Minnesota resources.
- In every region of the state provide business opportunities tied to local and regional economic, environmental and community amenities.
- Provide to all Minnesotans ample opportunities for decent, safe and affordable housing.
- Improve the environment and communities as a natural result of economic activity.

Goal 4: Minnesotans will conserve natural resources to give future generations an efficient and strong economy.

The Minnesota Milestones vision calls for the wise use of resources — conserving energy, reducing waste and developing innovative ways to recycle. People in Minnesota and throughout the world are gradually learning how to use natural resources in ways that can sustain both economic growth and a healthy environment over the long term.

— Minnesota Milestones 1998: Measures That Matter

To achieve sustainable outcomes, Minnesotans and their economy should:

- Because of the quality of life possible here, attract businesses and business expansions without added incentives.
- Replenish renewable resources at least as fast as they are used.
- Use nonrenewable resources efficiently while developing substitutes or substitute technologies for when these resources are no longer available.
- Use land efficiently and prudently while beneficiaries pay the full costs for these uses.
- Encourage self-regulation and focus regulatory requirements on verifiable, sustainable outcomes rather than procedural measures.

Goal 5: Minnesotans will restore and maintain healthy ecosystems in support of a healthy economy.

This goal expresses the importance of lakes, wetlands, forests and wildlife to Minnesota's quality of life. It also reflects the growing understanding that active promotion of healthy ecosystems and habitats, such as prairies and forests, is the key to abundant plant, animal and fish life. Healthy ecosystems serve many environmental, social and economic purposes.

— Minnesota Milestones 1998: Measures That Matter

To achieve sustainable outcomes, Minnesotans and their economy should:

- Create a nontoxic environment for people and ecosystems.
- Eliminate gradually the concept of "waste" by producing and consuming in ways that reduce or avoid use of materials in the first place, that reuse and recycle materials, or that return waste to "food" for either business or nature.
- Invest in the state's natural infrastructure — such as wetlands, streams, lakes, natural areas, corridors and forests — so as to nurture critical habitats, sustain clean air, land and water, and safely assimilate wastes.
- Restore and sustain community and ecosystem health.
- Improve the quality of life in Minnesota without diminishing it elsewhere.

With this description of a healthy Minnesota economy, we ask Minnesotans to question basic assumptions about the relationships between the environment, the economy and communities. We also intend that this description provide at least an initial picture of the destination toward which Minnesota's policies and approaches should lead. The next chapter, "Measuring what counts for a healthy economy," proposes specific measures and a new indicator of progress based upon the outcomes presented here. The other chapters also offer recommendations designed to point Minnesota toward this destination of a healthy economy.

Report overview

Smart Signals is organized around a set of key issues. Several of these were examined in detailed background papers developed by Sustainable Development Initiative staff. For copies of available background papers, contact Minnesota Planning.

Measuring what counts for a healthy economy: This chapter presents the Minnesota progress indicator — a new collection of 42 economic, environmental and community indicators that

collectively measure progress in a realistic and comprehensive way. This indicator could become a valuable tool for decision-makers, offering a new perspective on how we view progress.

Connecting corporate subsidies with environmental citizenship: This chapter examines whether the state pays twice for its economic development efforts, once in offering incentives to companies to locate or expand in Minnesota and again to help the same companies clean up pollution.

Ensuring clean, safe and reliable transportation: This chapter reviews the state's current gasoline tax and examines policies for ensuring safe, clean and accessible transportation.

Making home heating affordable: This chapter investigates the potential savings that could result if Minnesota offered added incentives for energy conservation rather than continuing the sales tax exemption for home heating fuels.

Developing a certified wood industry: This chapter examines whether the state should further encourage the certified wood industry as a component of its economic development strategy. The study reviews the experiences of other nations and states with certified wood industries and assesses the costs of certification against the economic, environmental and community benefits.

Making the property tax work for smart growth: This chapter investigates the influence of the state property tax structure on the nature and quality of development in Minnesota and evaluates the potential of site-value taxation as a way to correct the harmful economic signals the current property tax system sends.

Sending clear signals for air pollution control: This chapter identifies questions about Minnesota's air pollution emission fee system and suggests changes to send consistent signals for air pollution control.

MEASURING WHAT COUNTS FOR A HEALTHY ECONOMY

Measuring what counts for a healthy economy

Minnesota needs a flexible, realistic and comprehensive indicator to gauge its progress toward sustainable development. The Economics for Lasting Progress project has developed a new indicator, the "Minnesota progress indicator," to serve this purpose and to complement the various measures already in use.

Minnesotans, and specifically Minnesota policy-makers, have historically relied on such measures as the unemployment rate, the gross state product and median household income to assess the state's economic well-being. Modeled after the U.S. gross domestic product, Minnesota's gross state product attempts to measure productivity. But these indicators can be misleading. And they tell only part of the story.

Consider the 1989 Exxon Valdez oil spill. Here was an incident that did substantial damage to the environment. No one would say this was a good thing, yet viewed through the prism of the U.S. gross domestic product and Alaska's gross state product, the oil spill "improved" the economy because clean-up activities increased both measures.

To create a more accurate and holistic measure of the state's economic well-being, the Minnesota progress indicator is proposed. The Minnesota progress indicator is an aggregation of 42 economic, environmental and community measures. The indicator is not intended to be the definitive indicator for Minnesota's economic well-being; it is rather a beginning step in integrating environmental, economic and community information in a way that can help citizens and policymakers view the state's progress from a more realistic and comprehensive perspective.

An underlying assumption of the Minnesota progress indicator is that in the long run Minnesota's economy can be healthy only if our environment and our communities are healthy. To capture these vital interdependent relationships, the Indicator uses comprehensive measures wherever possible. For example, rather than simply looking at income growth rates, the Indicator links income growth rates to the growth rates of housing costs and tuition.

Similarly, the Minnesota progress indicator gauges productivity by relating the gross state product to the energy used and waste produced in the economy, creating measures of the economy's energy and materials efficiency. These kinds of measures help determine if we are improving our economy at the expense of our communities and our environment.

> *We cannot overstate the value of measuring progress toward sustainable development. Indicators provide a concrete way for people to envision sustainable development and to work toward it.*
> — Minnesota Round Table on Sustainable Development, 1998

The Minnesota progress indicator is simple yet comprehensive. It can be viewed as a composite index or measures within it can be viewed separately to reveal the progress or decline of various aspects of the economy, environment and communities. This highlights the main purpose of the Minnesota progress indicator, which is to help policy-makers and citizens realistically assess strengths and weaknesses of the economy.

A caveat is in order, however. The Minnesota progress indicator does not measure all facets of Minnesota life. Certain areas, such as volunteerism and civic involvement, were excluded

to focus on the progress of Minnesota's economy — broadly defining the economy to include community and environmental factors that directly influence the economy.

In addition, the Minnesota progress indicator was unable to measure how well the state is doing in certain areas because data is not available. Otherwise, such factors as underemployment, percent of locally owned businesses and household hazardous waste generated and consumed would have been included. To improve the Indicator, the state should systematically begin collecting data on these and other measures.

The Minnesota progress indicator cannot answer all questions about the well-being and the progress of Minnesota's environment, economy and communities. However, by providing a comprehensive look at Minnesota's economic well-being it offers tremendous value in pointing out areas of concern and success to policymakers and citizens.

Next steps

To better measure what counts, *Smart Signals* recommends that:

- Minnesota adopt a new way to measure the health of its economy. This new indicator of progress, the Minnesota progress indicator, would be updated on a biennial basis by Minnesota Planning and its partners.
- Minnesota Planning spearhead a collaborative statewide initiative to identify and define additional measures that should be included in the Minnesota progress indicator, and any other improvements that may be warranted.
- State agencies, communities and economic development authorities use the Minnesota progress indicator to consider areas needing improvement and the potential environmental, economic and community effects of projects.

A new measure of progress

The development of the Minnesota progress indicator was predominately influenced by three works: *The Genuine Progress Indicator, Minnesota Milestones* and the "Describing a healthy economy" section in this report. Developed on a national level by Redefining Progress, a California policy think-tank, the genuine progress indicator incorporates various economic, environmental and community factors into a single index. While the measures in the genuine progress indicator were found to be too broad for any useful state application, the concept of aggregating economic, environmental and community measures was determined to be beneficial.

Using extensive public input, Minnesota Planning's *Minnesota Milestones* project developed goals and a set of progress indicators for the state. Seventy measures based on the goals were developed in the areas of people, community, democracy, economy and environment. The Minnesota progress indicator is not designed to replace *Minnesota Milestones*; rather it should supplement it by providing a more detailed look at Minnesota's economy as it relates to the state's environment and communities. Five *Minnesota Milestones* goals as well as several measures were used in the Minnesota progress indicator.

The "Describing a healthy economy" section (see pages 4 to 6) provides a vision and characteristics of what a healthy economy should look like, using five *Minnesota Milestones* goals as the foundation. "Describing a healthy economy" further identifies a series of desirable outcomes, which are the basis of the Minnesota progress indicator.

After examining more than 100 measures for inclusion in the Minnesota progress indicator, 42 were selected to measure Minnesota's progress toward the outcome statements. Data for the measures was gathered for the years 1990 to 1997. Inadequate data before 1990

GOALS AND MEASURES OF THE MINNESOTA PROGRESS INDICATOR

Forty–two measures were developed for the Minnesota progress indicator. These are organized under five goals and 14 desired outcomes or objectives.

Goal: Minnesota will have strong, sustainable economic development.

Business diversity

1. Employment by sector
2. Firms in each sector
3. Gross sales in each sector
4. Distribution of regional employment to population

Business climate

5. Business incorporations to business failures ratio
6. Minnesota's national rank in new companies and business closings
7. Changes in business taxes

Productivity

8. Gross state product per worker
9. Gross state product per unit of energy consumption
10. Gross state product per amount of solid waste
11. Emission-to-manufacturing job ratio

Goal: All Minnesotans will have the means to maintain a reasonable standard of living.

Skilled workforce

12. High school graduates pursuing additional education

Jobs and wages

13. Unemployment rate
14. Comparison of median and poverty income levels
15. Comparison of growth between poorest and wealthiest income levels

Access to services

16. Tuition costs as a percent of median disposable income
17. Health insurance coverage
18. Cost of health insurance
19. Per capita public transportation trip miles for the Twin Cities

Goal: Rural areas, small cities and urban neighborhoods throughout the state will be economically viable places for people to live and work.

Local value-added

20. Contribution of value-added agriculture
21. Contribution of value-added timber

Housing

22. Median monthly rent as a percent of household income
23. Income-to-house-price ratio
24. Home ownership rates

Goal: Minnesotans will conserve natural resources to give future generations a healthy environment and a strong economy.

Renewables

25. Timber harvests
26. Alternative energy consumption as a percentage of total consumption
27. Annual water use per day
28. Comparison of aquifer levels to historical averages

Nonrenewables

29. Annual energy consumption
30. Annual gasoline consumption
31. Annual vehicle miles traveled

Goal: Minnesotans will restore and maintain healthy ecosystems in support of a healthy economy.

Toxicity

32. Emissions of air pollutants
33. Atrazine levels in monitored wells
34. Toxins released per year

Solid waste and recycling

35. Solid waste per person
36. Percent of solid waste recycled

Natural infrastructure

32. Emissions of air pollutants (also toxicity)
37. Annual quantity of fertilizer used
38. Emissions of carbon dioxide
39. Leaking underground storage tanks
40. Lake transparency
41. Nitrate levels in monitored wells

Ecosystem health

42. Population trends of keystone indicator species by each habitat type

Data sources

These organizations provided data for the Minnesota progress indicator.

Apartment Search, Edina
Bureau of Economic Analysis
Corporation for Enterprise Development
Dun & Bradstreet Marketing Services
Federal Housing Finance Board
Higher Education Services Office
U.S. Census Bureau
U.S. Environmental Protection Agency

Minnesota state agencies:

Agriculture
Children, Families & Learning
Economic Security
Finance
Health
Human Services
Metropolitan Council
Minnesota Agricultural Statistics
Minnesota Planning
Natural Resources
Office of Environmental Assistance
Pollution Control Agency
Public Safety
Revenue
Trade and Economic Development

prevented a longer historical perspective. For each of the eight years examined, the percentage change of each measure was assessed in relation to 1990 levels. Each measure was considered on an equal basis, none were weighted.

These 42 measures were used in four ways. First, all 42 measures were aggregated to form the Minnesota progress indicator. Second, the 42 measures were sorted into three categories: economy, environment and community. When appropriate, measures were used in more than one category. Third, the measures were sorted under 14 of the 22 outcome statements. Due to a variety of constraints, eight outcome statements do not have any measures. Finally, trend data is available on each of the measures. A more thorough explanation of the methodology and assumptions underlying the Minnesota progress indicator is available in an expanded version of this study.

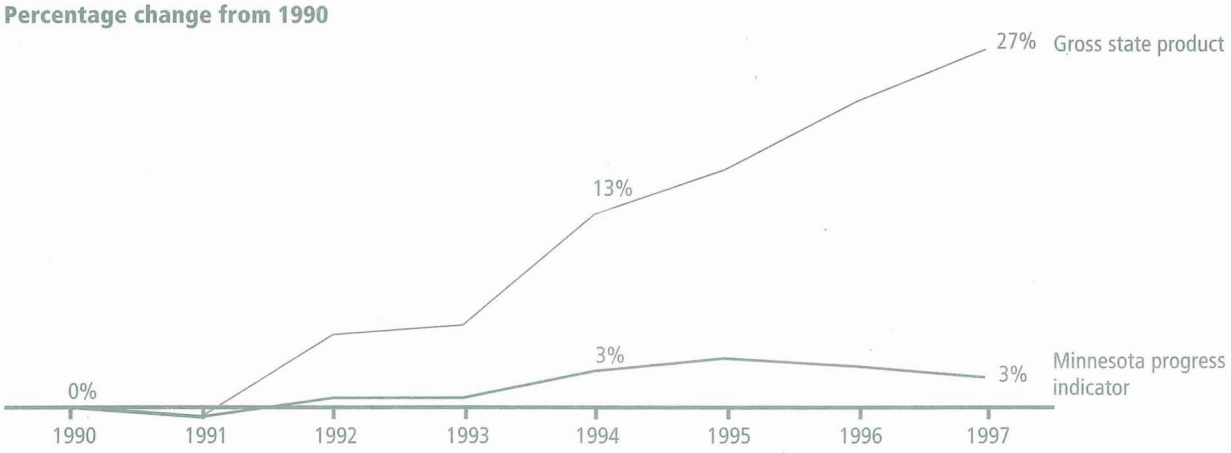
Minnesota progress indicator: Overall, the Minnesota progress indicator shows that Minnesota's economic health improved only slightly during the 1990s — not nearly as dramatically as the gross state product would indicate. In fact, the gross state product shows that the economy had nine times more growth than the Minnesota progress indicator suggests between 1990 and 1997. Specifically, the Minnesota progress indicator grew three percent while the gross state product had a 27 percent gain. This raises the question of whether the gross state product paints too rosy a picture of the state's economy. Strong state and national economies apparently fueled most of the growth for both the gross state product and the Minnesota progress indicator between 1993 and 1996.

Economy: Despite the fact that Minnesota and the nation experienced prolonged economic growth as measured by traditional methods, the 26 economic measures that constitute this indicator showed mixed results. Collectively, the Minnesota progress indicator's economic measures stayed below 1990 levels throughout the entire period. They hit their lowest point in 1991 and peaked in 1997.

Besides using such traditional economic measures as the gross state product, income and unemployment, the Minnesota progress indicator's economic measures also include elements such as business failures and the distribution of businesses.

MINNESOTA'S GROSS STATE PRODUCT CLEARLY OUTPERFORMED THE MINNESOTA PROGRESS INDICATOR

Percentage change from 1990



Minnesota's gross state product is a measure of all goods and services produced in a year. The Minnesota progress indicator is comprised of 42 economic, environmental and community elements that measure the economic progress of the state.

Source: Minnesota Planning

In addition, the Minnesota progress indicator takes conventional economic measures and meshes them with new elements to create more comprehensive measures. For example, the Indicator relates the gross state product to energy use, offering a new measure of the economy's energy efficiency, a factor expected to become more and more significant as oil supplies diminish and global climate change dictates policy change.

Environment: The measures that compose the environmental factor capture three specific interactions between environment, economy and community. The first set deals with the environmental damage (costs) that result from business activities. The second evaluates whether or not our natural capital is being depleted as a result of our activities. The third measures overall environmental quality as a business asset.

Based on the 21 environmental measures in the Minnesota progress indicator, Minnesota is doing a better job of taking care of the environment than it did in 1990. Gains occurred between 1990 and 1995 before the indicator leveled off. Much of the improvement can be attributed to our success in controlling point sources of pollution, as indicated by reduced air pollution, fewer underground storage tanks that leak, and more recycling. A different picture would emerge if we focused exclusively on the indicators that measure the depletion of natural capital or environmental quality.

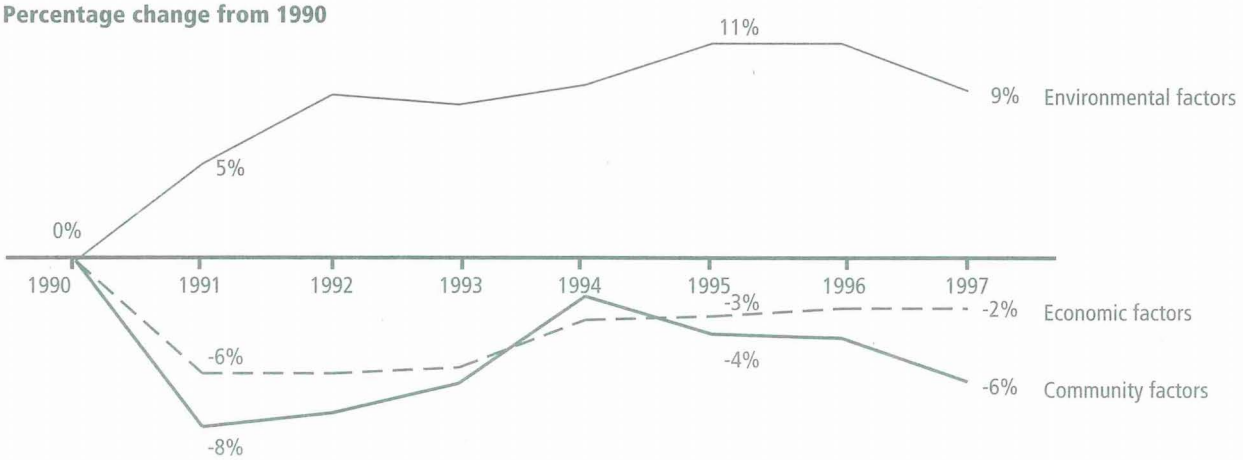
Community: Overall, the quality of life, as measured by the 15 community elements, worsened between 1990 and 1997, though there was a brief rally in the mid-1990s. The community measures include such things as income distribution, access to jobs, education and health care. Higher health care costs and a large number of business failures — nearly a three-fold increase from 1990 — drove the community measure down in the early 1990s. In the mid-1990s, however, a more equitable distribution of income and fewer business failures helped the measure climb.

Goals and outcomes

For each outcome, there is first a description of the outcome's importance for a sustainable economy, followed by a list of elements measured in the outcome, then an illustration of the trend for the

THE ENVIRONMENTAL FACTORS OF THE PROGRESS INDICATOR IMPROVED WHILE THE ECONOMIC AND COMMUNITY FACTORS FELL BELOW 1990 LEVELS

Percentage change from 1990



The 42 measures of the Minnesota progress indicator were grouped into the categories of economic, environmental and community to evaluate the changes in these three areas between 1990 and 1997.

Source: Minnesota Planning

outcome, an explanation of the trend, and finally a list of other indicators that were considered but not included. Many measures were excluded due to lack of data.

Goal 1: Minnesota will have strong, sustainable economic development.

Minnesota's economy has a diverse mix and geographic distribution of businesses. This outcome draws attention to the composition of Minnesota's economy and the spread of economic opportunities in the state. An important characteristic of a robust economy is a diverse mix of economic activities, which reduces its vulnerability to an economic downturn in one or more industries. In addition, measuring the health of any economy must take into consideration the availability of economic opportunities at all locations, including metropolitan, urban and rural areas. Thus, Minnesota's economy must have a diverse composition of economic activities and also provide people living everywhere in the state access to economic opportunities without requiring them to move to other locations.

Four measures were used to assess the strength of Minnesota's economy. The measures are employment by sector, percent of firms in each sector and sales in each sector. A measure of employees per unit of population in Minnesota Planning Areas, as defined by the Minnesota Department of Economic Security, is used as a surrogate for the availability of economic opportunities across the state.

The composite indicator for this outcome shows that since 1990, Minnesota's economy has become more diverse and more economic opportunities have developed for people living in different parts of the state. However, a closer look at the individual measures show that the geographic distribution of employees has improved but Minnesota's economy is becoming slightly more specialized. All three industrial composition measures show a downturn. Though this pattern may suggest increased vulnerability, it is important to examine the sectors that are increasing in importance to determine their volatility and whether they offer better opportunities for employees.

Other measures considered, but not included due to lack of data, were the geographical distribution of new businesses and jobs in the state and the distribution of natural resource consumption or energy use by economic sector.

BUSINESS DIVERSITY IMPROVED MINIMALLY

Percentage change from 1990

The business diversity factor measures the distribution of employment by sector, percent of firms in each sector, proportion of sales by sector and the distribution of employees and population in Minnesota planning areas.

Source: Minnesota Planning

Minnesota creates a business climate that fosters entrepreneurship and profitability through resource productivity and operational efficiency and that encourages business to invest in communities and the environment. A healthy economy attracts and maintains business investments due to local opportunities and the overall business climate. Businesses in such an economy would have a long-term interest in the community and would be more likely to invest in the community. For Minnesota's economy to be competitive, it must retain existing businesses, foster entrepreneurship and generate reasonable returns on investment.

Three factors measure entrepreneuership and profitability in Minnesota's economy. These are business success and failure rates, the state's national rank in new business incorporations and percentage rate of businesses closing, and corporate tax on profits. Each year, the Corporation for Enterprise Development ranks all states for their new companies (normalized by the number of workers) and business closings.

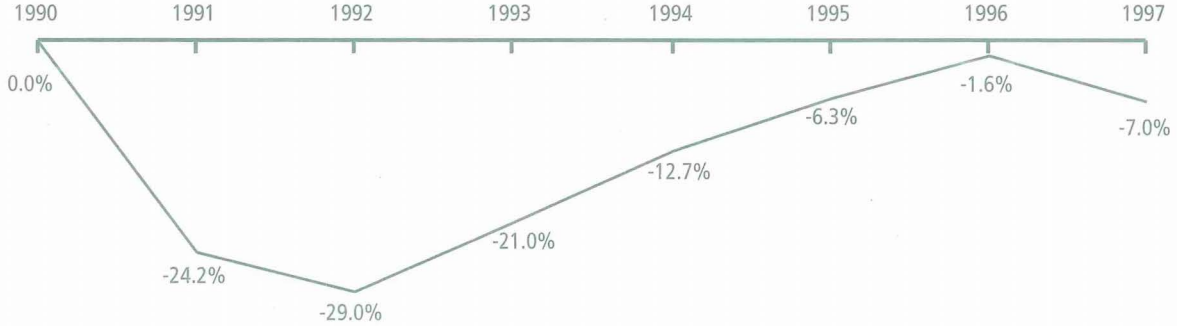
The data suggest a substantial decline in Minnesota's business climate between 1990 and 1992, followed by improvements between 1992 and 1996, before falling again in 1997. The decline in the early 1990s was driven mainly by a substantial number of business failures (66.8 percent more in 1991 than in 1990 and 64 percent more in 1992). Although failure rates fell between 1993 and 1996, the rates began to increase again in 1997, pulling down the overall indicator. In comparison with other states, Minnesota does an excellent job of maintaining existing business but has been less successful in attracting new companies.

Although measures for business investment in the community and the environment should be included, that kind of data is not available. Measures considered, but not included for lack of data, were businesses that contribute financially to non-profit organizations or to the community, business expansion as measured by employment or gross sales, the number of successful businesses that have started within the last five years, businesses involved in school and civic events and number of businesses involved with pollution prevention programs.

Minnesota efficiently transforms natural resources, energy, waste, knowledge, information and skills into goods and services. Productivity is an important component of a healthy economy. However,

MINNESOTA'S BUSINESS CLIMATE FELL AND THEN RECOVERED

Percentage change from 1990



Elements of the business climate factor include the ratio of new business incorporations to business failures, Minnesota's national rank in business climate and changes in corporate tax on profits.

Source: Minnesota Planning

productivity should not be gauged only in terms of income and products resulting from economic activities. The amount of resources used in the production process and the waste generated must also be considered.

The gross state product is the most common measure of productivity. However, it does not consider the use of resources and waste generation in the production process. We attempt to compensate for this limitation by linking the gross state product with labor (gross state product per worker), energy consumption (gross state product per million British Thermal Units of energy consumed) and solid waste generation (gross state product per ton of solid waste). In addition, an emissions-to-job-ratio for the manufacturing sector is computed.

After a slight decrease between 1990 and 1991, Minnesota's economy recorded sustained improvements in productivity. Consequently, Minnesota made more efficient use of its resources and generated less waste in the process. Although worker productivity and energy use improved, the far greater and sustained improvements in waste generation and emissions account for the overall upward trend of the composite index.

Other measures considered but not included for lack of data were gross state product per amount of raw material used (natural resource depreciation) and hazardous waste generation.

Goal 2: All Minnesotans will have the means to maintain a reasonable standard of living.

Minnesota produces a highly skilled workforce that meets business and community needs.
The quality of workers' education is important for economic productivity and also for effective participation in the community.

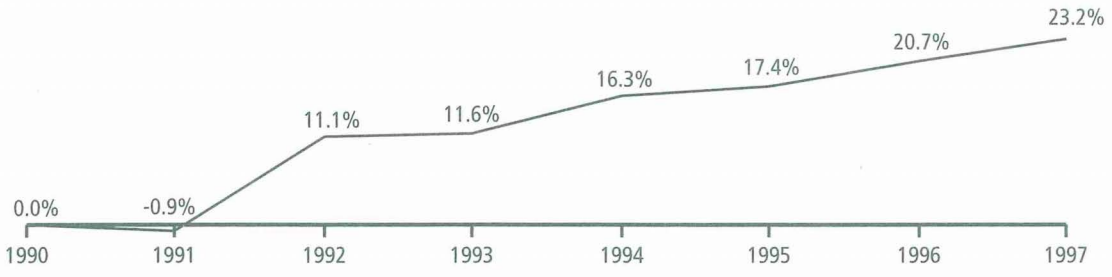
Although many measures were considered for this outcome, ultimately, the percentage of high school graduates who pursue additional education or training became the sole measure. This is largely due to data constraints. This factor is a good measure of initial commitment to education or skill training by young people who will make up the state's future work force.

The data show some improvements in post-high school education and training, especially between 1990 and 1994 and a slight decrease thereafter. A cautionary note: It is not appropriate to interpret changes from year to year since the state's survey of high school graduates has not been based on a consistent and representative sample.

Other measures considered but not included for lack of data were the number of businesses satisfied with the training of employees coming out of universities and colleges, the percentage of labor force involved in continued learning, labor force broken down into

PRODUCTIVITY HAS STEADILY IMPROVED

Percentage change from 1990



The productivity factor includes gross state product per worker, gross state product per unit of energy consumption, gross state product per ton of solid waste and a toxic release inventory emission-to-manufacturing job ratio.

Source: Minnesota Planning

highest education attainment level and jobs filled by non-Minnesota residents.

Minnesota produces jobs that provide people with wages sufficient to meet basic needs and contribute to society. Having a labor force that earns good wages is an important characteristic of a vibrant economy. A low unemployment rate typically reduces welfare spending and increases income and tax revenues.

The measures for this outcome are the unemployment rate, a comparison of median and poverty income levels and a comparison of income growth rates for the poorest versus the wealthiest citizens.

Looking at distribution of income among Minnesotans during the seven-year period 1990-1997, the poorest 20 percent gained more financial ground than did the wealthiest 20 percent. However, the growth in median income for a family outpaced the growth of income for residents classified as poor by federal guidelines. In addition, Minnesota's unemployment rate fell to historically low levels by 1997.

Other measures considered, but not used due to lack of data included underemployment, hours required to work at minimum wage to meet basic needs and the percent of jobs that pay less than a livable wage.

Minnesota provides fair and affordable access to jobs, education, transportation, health care and other basic services. Access to health care, education, transportation and other basic services is essential for a strong economy and thriving communities.

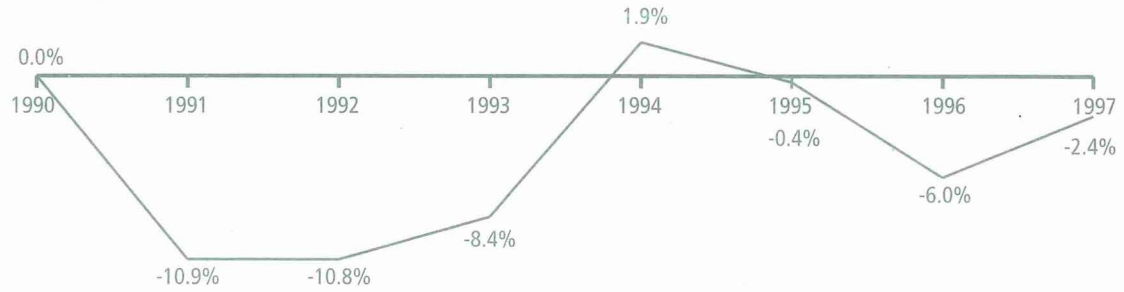
SKILLS OF MINNESOTA'S WORK FORCE HAVE RISEN

Percentage change from 1990

This indicator is based on the percentage of high school students who pursue additional education.
Source: Minnesota Department of Children, Families and Learning

EMPLOYMENT AND WAGES WERE TURBULENT BETWEEN 1990 AND 1997

Percentage change from 1990



Unemployment rate, comparison of poverty income to median income and comparison of growth rates for the poorest and wealthiest Minnesotans make up this indicator.
Source: Minnesota Planning

The measures selected for this outcome are tuition costs as a percent of median disposable income, percentage of Minnesotans with health insurance coverage, the average monthly cost of health insurance and public transportation trip miles for the Twin Cities compared to population.

Minnesotans have less access to basic services than in 1990, which is primarily because tuition and health care costs rose faster than income between 1990 to 1997. The public transportation and health care coverage measures fluctuated above and below the 1990 levels throughout the time period.

Other measures considered but not used due to lack of data were number of vocational and job training programs and the percent of Minnesotans living within one-quarter mile of a public transit stop.

Goal 3: Rural areas, small cities and urban neighborhoods throughout the state will be economically viable places for people to live and work.

Minnesota encourages locally owned and controlled businesses and promotes local production that adds value to Minnesota

ACCESS TO EDUCATION, HEALTH CARE AND TRANSPORTATION CONTINUOUSLY FELL

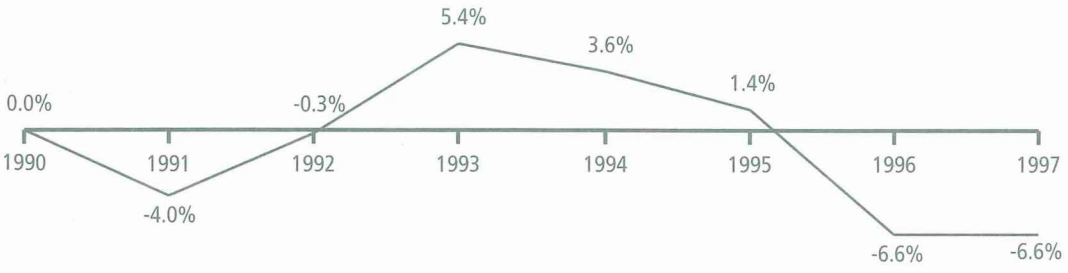
Percentage change from 1990

The measures graphed here are tuition costs as a percent of median disposable income, health insurance coverage, health insurance costs and per capita public transportation miles for the Twin Cities.

Source: Minnesota Planning

VALUE-ADDED TIMBER AND AGRICULTURAL PRODUCTS SHOW A MIXED TREND

Percentage change from 1990



The factors included in this chart are sales of value-added timber and agricultural products as a percent of Minnesota's gross state product.

Source: Minnesota Planning

resources. Community and state economies benefit if they can add value to homegrown natural resources. In Minnesota, adding value to agricultural and timber products results in jobs, income and taxes within the state rather than elsewhere. Similarly, if businesses are owned locally profits are more likely to stay in Minnesota.

The measures used for this outcome are sales of value-added agricultural products as a percent of total gross state product and sales of value-added timber products as a percent of total gross state product.

While both factors were below 1990 levels at the beginning and the end of the time period considered, the upward trend in the middle is a result of an increase in value-added agriculture products in 1993 and 1994 and value-added timber products in 1995.

Other measures that were considered but not used due to lack of data were the percent of locally owned businesses, percent of products/services that local businesses buy from each other and a comparison of wood processing volume to saw-timber harvest volume.

The state and communities provide ample opportunities to all Minnesotans for decent, safe and affordable housing. Shelter is a necessity of life, and thus it is imperative that all Minnesotans have access to safe and affordable housing.

The measures used for this outcome assessed median annual rent as a percentage of median family income, the growth in house prices compared to the growth in the median household income level and the percent of the state's residents who are home owners. The apartment rent data that was included was for the Twin Cities since it is the only data available.

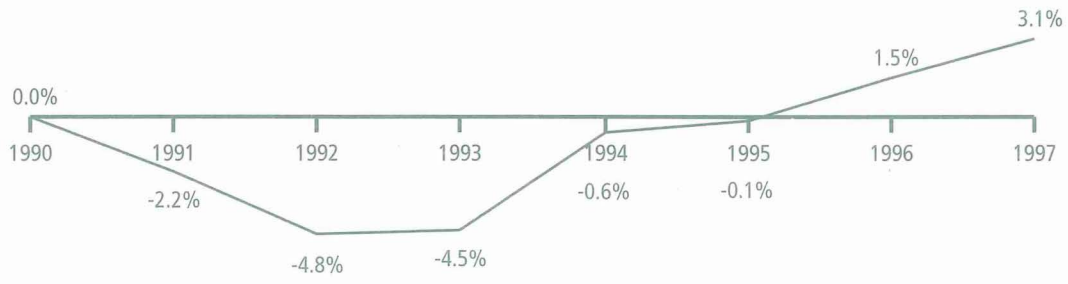
Overall, access to housing has improved. Home ownership has become more expensive during this period, but more Minnesotans own their homes and rents have become more affordable.

Other measures considered but not included due to lack of data were distribution of affordable housing throughout the state, percent of households spending more than 30 percent of their income on housing and annual growth in assessors market value of the state's homesteads.

Goal 4: Minnesotans will conserve natural resources to give future generations a healthy environment and a strong economy.

HOUSING ACCESS FELL BEFORE ESCALATING IN THE MID-90S

Percentage change from 1990



This chart measures median monthly rent as a percent of median household income, ratio of median-household-income-to-house-prices and home ownership rates.

Source: Minnesota Planning

Minnesotans replenish renewable resources at least as fast as they are used. Maintaining, not degrading, Minnesota's renewable resources is vital to ensuring a healthy environment, strong communities and vibrant economy in the future. Moreover, Minnesota should continue developing its ability to use renewable resources for generating energy. Doing so will improve the state's economy and environment.

Measures for this outcome are volume of timber harvest, percent of renewable energy (wind, hydroelectric and solar power) consumed, annual water use per day per capita and change in the depth of water table (aquifers). Due to our limited knowledge of what constitutes a sustainable rate of use, these measures cannot be used directly to assess whether resources are being used up faster than they can be replaced. They are, however, useful measures of our consumption of renewable resources.

In general, Minnesotans are using renewable resources at a faster rate in 1997 than they did in 1990. For example, more of our energy is from renewable sources — considered a plus. However, our timber harvest has increased and we are using water at a higher rate. In fact, our aquifers are at levels lower than historical averages.

Other measures considered for this outcome, but not used for lack of data included water use as compared with a 1:50-year drought rainfall recharge amount and yearly tons per acre loss of topsoil.

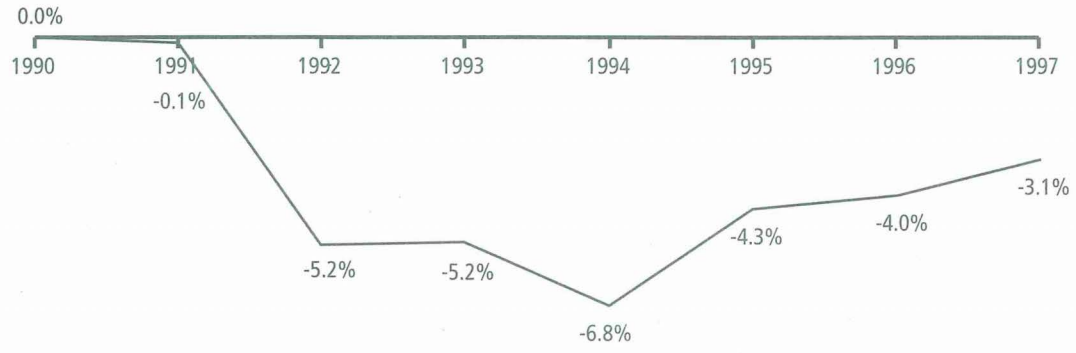
Minnesotans use nonrenewable resources efficiently while developing substitutes or substitute technologies for when these resources are no longer available. Minnesotans are increasingly dependent on fossil fuels for heating, electricity and, especially, transportation. This is a concern because of the harmful effect that extracting, transporting and burning fossil fuels has on communities and the environment. Though renewable fuels play a small role in providing energy needs today, it is likely that their role will increase in the future.

The measures considered for this outcome are annual energy consumption per person, annual gasoline consumption per capita and annual vehicle miles traveled per person.

Minnesotans use more nonrenewable energy — namely gasoline — than they did seven years ago. This increased use of gasoline is related to an increase in the number of vehicle miles traveled since 1990.

MINNESOTA'S RENEWABLE RESOURCES ARE UNDER GREATER PRESSURE

Percentage change from 1990



This chart measures the combined trends of volume of timber harvest, percent of renewable energy used, annual water use and change in depth of two Minnesota aquifers compared to historical levels.

Source: Minnesota Planning

Overall per-person energy consumption has risen as well.

Other measures considered but not included for lack of data were the amount of minerals extracted each year in relation to known reserves, and reduced energy production due to conservation measures.

Goal 5: Minnesotans will restore and maintain healthy ecosystems in support of a healthy economy.

Minnesota needs to create a nontoxic environment for people and ecosystems. Industrial production processes have long used and created toxic chemicals. Stricter regulations in the 1990s have reduced the use of some toxic chemicals, but more could be done by businesses to reduce use and creation of toxics. Ensuring that Minnesota has a nontoxic environment also requires concerted efforts to reduce toxins used in the state's households. No indicators could be found to measure this.

Measures for this outcome are percent of monitored wells with atrazine below or equal to 1 part per billion, criteria air pollutant emissions and the tons of toxins released into the environment as measured by the Toxic Release Inventory.

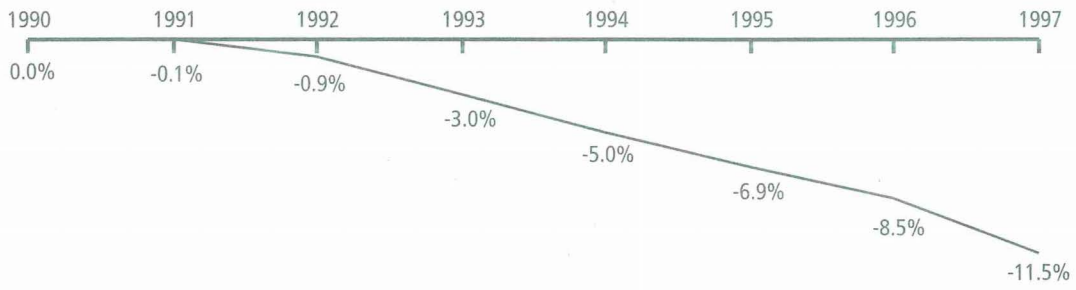
The three measures used here suggest that, by 1997, Minnesota was releasing fewer toxins into its air, water and soil. A dramatic decrease in the Toxic Release Inventory, a measure used by the Environmental Protection Agency, and a drop in air emissions from the criteria pollutants during this period drove this outcome's trend line in a positive direction. One caveat: The Toxic Release Inventory measures only a portion of hazardous chemicals used and it may be misleading to assume that the overall amount of hazardous waste has decreased due to a drop in the inventory.

Other measures considered but not included for lack of data were the volume of hazardous waste generated each year, and the pounds of household hazardous waste generated by type.

Eliminate the concept of "waste" by producing and consuming in ways that reduce or avoid use of materials in the first place, that reuse and recycle materials, or that return waste to "food" for either business or nature. It is likely that many consumers and many businesses waste resources.

MINNESOTANS ARE USING MORE NONRENEWABLE (IRREPLACEABLE) SOURCES OF ENERGY

Percentage change from 1990



This trend line represents the combined annual energy consumption, annual gasoline consumption and annual vehicle miles traveled.
Source: Minnesota Planning

Waste can be generated during production, consumption and disposal. Today, however, many businesses recognize that reducing waste helps their bottom line. At the same time, consumers are doing a better job of recycling.

With toxic waste being considered in the previous outcome, the factors measured under this outcome are the tons of solid waste per person per day and the percentage of solid waste recycled.

Though Minnesotans are putting more waste into their landfills, many more residents have embraced recycling as a means of disposal. The amount of solid waste generated per capita increased by 11 percent between 1990 and 1997. At the same time, the percent of solid waste that was recycled doubled to reach 46 percent in 1997.

Another measure that was considered but not used due to lack of data was the number of businesses using recycled material to produce a product. This would be a valuable future indicator.

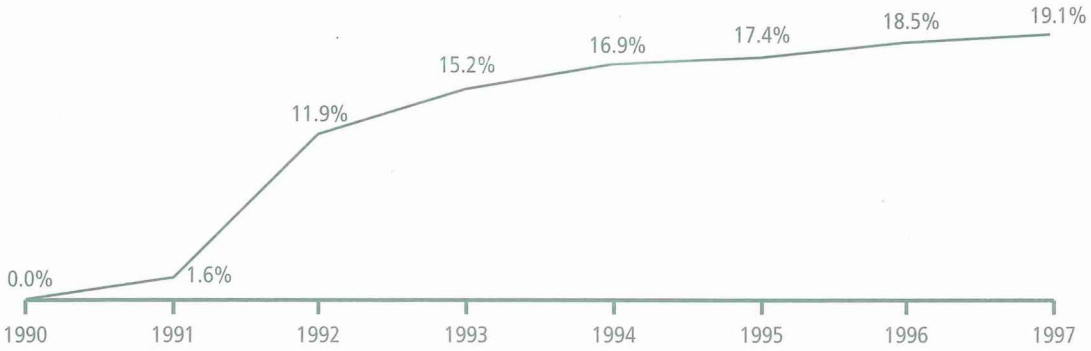
Invest in the state's natural infrastructure — such as wetlands, streams, lakes, natural areas, corridors and forests — so as to nurture critical habitat, sustain clean air, land and water, and safely and productively assimilate wastes. Improving the quality of Minnesota's air, water and land is one of the most significant challenges facing the state. Given the levels of pollution and waste released into Minnesota's air, water and land, it is important that we reduce pollution to levels that allow our air, water and land to absorb our waste without damage.

To assess the condition of Minnesota's air, water and land, the following measures were identified: the number of leaking underground storage tanks; emissions of criteria air pollutants (sulfur dioxide, nitrogen oxide, lead, volatile organic compounds, particulate matter less than 10 microns in diameter); carbon dioxide emissions, lake transparency for surface water, annual use of fertilizer and nitrate levels for ground water.

Minnesota's natural infrastructure has been showing signs of distress, especially after 1994. Increasing levels of carbon dioxide emissions have reduced air quality while higher levels of nitrate in wells signify deterioration in groundwater quality. The good news is that the state has fewer leaking underground storage tanks and that surface water quality seems to be improving. Emissions of criteria pollutants have fallen slightly during the period as well.

MINNESOTA'S ENVIRONMENT HAS BECOME LESS TOXIC

Percentage change from 1990

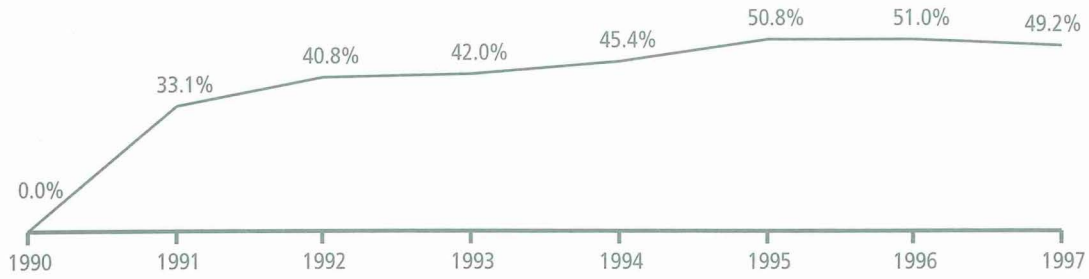


The three factors in this trend line include criteria air pollutant emissions, percentage of monitored wells with atrazine below or equal to one part per billion and toxic release inventory emissions.

Source: Minnesota Planning

PROGRESS HAS OCCURRED IN ELIMINATING WASTE

Percentage change from 1990



Trends measured on this chart are tons of solid waste generated and percent of solid waste recycled.

Source: Minnesota Planning

IMPROVEMENTS IN MINNESOTA'S AIR, WATER AND LAND ARE FALLING OFF

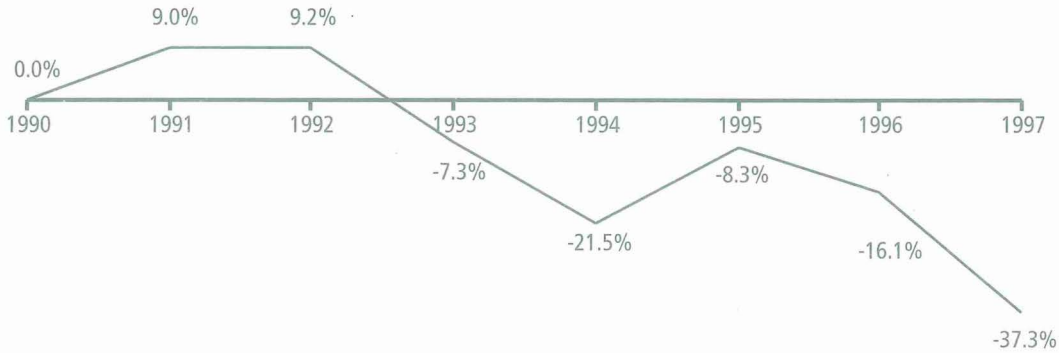
Percentage change from 1990

This trend line measures emissions of criteria air pollutants, emissions of carbon dioxide, number of leaking underground storage tanks, comparison of recent and historical lake transparency, annual quantity of fertilizers used and percentage of monitored wells with below or equal to three parts per million of nitrate.

Source: Minnesota Planning

THE HEALTH OF MINNESOTA'S HABITAT HAS BEEN DECLINING

Percentage change from 1990



This graph combines the population trends of keystone indicator species (loon for lakes, sharp-tailed grouse for brush land, black-throated green warbler for forest, prairie chicken for prairie and pheasant for farmland) for Minnesota's five primary habitat types.

Source: Minnesota Planning

Other measures considered but not used due to lack of data were acidity of rainfall and surface water, number of hazardous waste sites with the percent cleaned or being remediated and acres of contaminated land.

Minnesota needs to sustain and restore community and ecosystem health. Minnesota is blessed with a diverse natural environment, including prairie and farmland in the south and west, forests in the north, brush land in the northwest and east-central counties and lakes scattered throughout the state. The health of these ecosystems is vital not only for the animals and plants that comprise them, but also for Minnesota's economy and communities.

This outcome has only one measure — population trends of key indicator species for each kind of habitat. Five species are combined in this indicator. They are loons for lakes, sharp-tailed grouse for brush land, black-throated green warblers for forest, prairie chicken for prairie and pheasant for farmland.

The Minnesota progress indicator shows the health of Minnesota's ecosystem has worsened since 1992, after an improvement in 1991 and 1992. The decline is primarily caused by decreasing populations of sharp-tailed grouse in the brush land and pheasant in the farmland. Data on loons goes back only to 1994. However, the loon population has increased since then. The prairie chicken and warbler populations fluctuated throughout the time period.

Other measures considered but not included because of lack of data were the number of acres threatened with ecologically significant weed and feral animal populations, and the number of acres in managed areas that offer some degree of legal protection to plants and animals and incidents of habitat fragmentation.

CONNECTING CORPORATE SUBSIDIES WITH ENVIRONMENTAL CITIZENSHIP

Connecting corporate subsidies with environmental citizenship

Do Minnesota's incentives for business promote the long-term environmental, as well as economic, goals of the state? To find out, the Economics for Lasting Progress project compared businesses receiving state or local grants, loans or other incentives for economic development and job creation with those cited for violating pollution regulations.

The goal was to examine whether economic development authorities may be working at cross-purposes by promoting economic growth and job creation at the expense of health and environmental protection. Does the state pay twice — first, for development aid and, second, for dealing with the effects of air, water or land pollution?

Compliance with environmental regulations should logically be a minimum standard — a small step toward more sustainable approaches to development. But some companies appear to find basic compliance difficult. Further, while the public might expect companies that receive aid to comply with environmental standards, economic development agencies often may not ask the question.

Relying on mere compliance with environmental law may also warrant rethinking. Today, citizens want more for their public investment dollar. "More" might mean investing in jobs that provide a living wage or rewarding companies that help build better communities, in addition to better products. "More" might also mean, as a condition of public subsidy, helping companies routinely work with natural resources in a way that actually improves environmental quality and contributes to smart growth.

When the Economics for Lasting Progress project checked for connections between business assistance and environmental performance, it encountered a number of road blocks. While these were often technical, it became clear that the system does not make the link between environmental performance and business incentives easy to evaluate.

Nevertheless, a six month analysis uncovered instances in which companies with environmental violations received economic assistance. In fact, about 10 percent of the more than 800 companies receiving assistance between 1996 and 1999 had records of such violations over the past decade. Just three years of aid were considered since the information on economic assistance was organized and made accessible only in the last three years (because of new statutory requirements).

> *The state's intelligent investment of its public resources in a manner that supports environmentally respectful, well-planned growth and promotes equality of opportunity is vital to our sustained economic progress.*
> — Philip Angelides, California State Treasurer

This study found that Minnesota does *not* systematically connect business development with environmental citizenship:

Economic development agencies do not consider environmental records when deciding which companies receive grants or loans. Accountability for environmental violations is not built into business assistance programs, although there is more coordination when it comes to economic development assistance for cities.

State law does not require economic development agencies to look beyond the jobs

factor. While the law now requires reporting on the wages and jobs created, it does not ask agencies to evaluate a company's environmental performance before giving aid.

Economic development agencies may also not make this cross check because the data is not accessible or easy to search. It is difficult for agencies to look at pollution records before providing assistance because the databases have not been designed for this purpose.

A new approach is needed

Minnesota's economic development authorities do a laudable job in seeking to improve the state's economic well-being. Unlike some, they do not attempt to lure companies from other states. And most Minnesota cities have changed the way they approach economic development, no longer chasing jobs at any cost. However, authorities still do not routinely make the connection between business development and environmental performance. The following recommendations call for this connection and suggest how state and local authorities could do this efficiently and effectively.

- The state should make the connection between corporate subsidies and environmental citizenship, creating new conditions for giving business development aid and for reporting, as well evaluating, the success of that aid. Making these new connections should become a routine activity in all state and local economic development efforts, but should be done in a way that keeps the process simple, straightforward and meaningful.
- The Department of Trade and Economic Development and the Pollution Control Agency should jointly design the information collection and management system necessary to make these connections both possible and easy.
- As a beginning step, applications for business development funds should trigger contact with the Minnesota Pollution Control Agency and other environmental agencies.
- As part of its new approach, the state should adopt an expanded set of criteria for the award of economic development incentives by state and local government. Initially, this might be based on environmental performance as judged by records of violations and emissions.
- In the long run, criteria should reflect the broader economic, social and environmental goals and measures defined in the Minnesota progress indicator, *Minnesota Milestones* and the Smart Growth Initiative. Local and state economic development authorities should evaluate the effect of assisting a company on the state's, and a community's, economic, environmental and social health.
- The state should make this system and these new approaches visible, accessible and available to the public.

Taking a closer look

The Economics for Lasting Progress project evaluated data from the 1996-1998 *Business Assistance Reports*, which compile state, regional and local funding to businesses. Many other economic development aid programs such as wastewater infrastructure support, agricultural aids and many small city development programs were therefore not included in this evaluation. Further, technical assistance, other indirect financial support and most tax expenditures were not included, although they can have a significant impact on business decisions.

Mandated by a state law that took effect July 1, 1995, the Business Assistance report was the first of its kind in any state government. It provides for analysis that would otherwise not be possible. For information covering the period before 1996, each funding agency was responsible for deciding how and whether to catalog its records. As a result most of these are not readily accessible to either the general public or other agencies.

The project reviewed pollution violation records of facilities required to have state and federal permits for the release of pollutants to the air, land and water. Databases from the Pollution Control Agency included information on water effluent violations, air stack emission violations, hazardous waste violations and hazardous spills and releases. Two of the seven metropolitan counties also supplied data about hazardous waste violations. The analysis did not generally include superficial violations, which involve the failure to complete records properly or the failure to report a problem as required by law. However, in the case of hazardous waste violations, critical violations as defined by the responsible agency were used, and may include repeated paperwork violations or the failure to label hazardous containers.

In 1995, the Legislature passed a requirement that businesses receiving assistance produce a net increase in jobs within two years of receiving the funding. The statute defines business assistance as grants and loans greater than $25,000 and tax increment financing that promotes economic or job growth. Local and state funding authorities must now report the results of their projects annually to the Minnesota Department of Trade and Economic Development. This requirement began for projects receiving assistance after July 1, 1995. The reports cover the dollar amount of the financing, the number of jobs created, wage goals, and the results of the project.

Summary reports compiled for 1996, 1997 and 1998 do not include all the required information for all projects. Some information may not have been clearly requested or understood by the agencies completing the forms. The Department of Trade and Economic Development has changed the report format and is establishing training to get better compliance. Still, without this law and without the department's work to implement it, this study would have been nearly impossible to carry out.

For this study, the review of business assistance is limited to the three years that statewide data was available.

The project used pollution records to make the link to environmental citizenship for companies receiving economic aid. These are detailed below.

Water quality: Facilities receive permits to discharge specified amounts of pollution into navigable waters; they are required to report on the volume and concentration of the discharge based on the Federal Clean Water Act and Minnesota State Rules 7002.0220. The National Pollution Discharge Elimination System requires facilities to obtain permits to discharge a limited amount of effluent into surface waters. In Minnesota, a total of 1,300 facilities are permitted, 77 of which are major discharge facilities (60 percent municipal and 40 percent businesses). Permittees that do not fit into the major classification are called regular dischargers.

All facilities submit a monthly report that indicates the amount of the specific chemicals, toxins, or other pollutants discharged. Each facility has a list of reportable discharges, based on the industry and known substances in the discharge water. The reports from the major dischargers are reviewed quarterly by PCA staff and the database is corrected as needed. The reports from the approximately 1,220 facilities with regular permits are generally not reviewed for reporting accuracy.

This project reviewed records of the 26 major water dischargers from the business sector. For the 10-year period (1989–1998), they were responsible for only 35 percent of recorded violations (the 51 major municipal treatment systems accounted for 65 percent). The largest numbers of business violations occurred in electric utilities (26 percent), followed by mining (20 percent) and manufacturing (19 percent). The agricultural product processing sector accounted for

14 percent, paper processing for 12 percent and petroleum processing for nine percent. The total number of violations for businesses was 724 out of total of 2,086 violations. Although the facilities classified as major dischargers might not typically receive the kind of assistance covered in the analysis, no matches to business assistance received between 1996 to 1998 were noted.

The project reviewed approximately 291 business facilities with smaller, regular discharge permits (those with less than one million gallons water discharge per day). They had a total of 5,290 effluent violations over the last 10 years (1989–1998). The overall average was 1.8 violations per facility each year. Fifteen of the 291 facilities were found to have received public financial assistance and to have violations of water permits. The worst offender had a total of 144 violations over the 10-year period, while the next worst had 10 violations per year after 1993 and a total of 109 in the period.

Air quality: Federal air quality standards require that certain facilities limit the release of the six criteria pollutants: carbon monoxide, nitrogen dioxide, lead, particulate matter less than 10 microns, sulfur dioxide, and ground level ozone. In addition, Minnesota Rules require reporting of volatile organic compounds, hydrogen sulfide, and total suspended solids. Facilities must obtain air emission permits and report emission levels based on the category of the permit. A number of businesses are not required to obtain permits or report the emissions of air pollutants. These include automobile refinishing, chromium electroplating, dry cleaning and gasoline service stations.

Two databases of air emissions were reviewed: 1) stack data and 2) continuous emissions monitoring. The stack data lists measurements made periodically by a facility. Some facilities take measurements every quarter and others have not been measured in the last five years. The stack data represents about 640 facilities out of a total of about 4,300 facilities that have air emissions permits.

The 70 facilities that use continuous emissions monitoring are the industries with larger volumes of air emissions that have their own monitoring equipment. Data is collected at least four times an hour, 24-hours per day, except during maintenance and equipment breakdowns. The percentage of time during the quarter that the emission limit was exceeded is recorded. For each pollutant, a specific level of exceedance warrants a referral to enforcement staff.

Air quality stack data covered the years 1992 through 1998 and listed facilities that received a notice of noncompliance after the facility reported exceeding the air emission limits. A total of 178 notices were written during this period, covering 95 separate facilities and 71 different companies. About 70 facilities have their own monitoring equipment and are part of a continuous emissions monitoring program. The continuous emissions monitoring database lists the amount of time a facility exceeds an emission limit for each quarter in the calendar year.

Six of the 71 "stack" companies that had violations received business aid. Two of the businesses had last recorded a violation in 1994 before receiving funding in 1997. Two others, however, had violations in 1997, the same year that funding was provided and two had violations after receiving funding.

Hazardous waste: The Resource Conservation and Recovery Act passed by Congress in 1976 designates classes of hazardous materials and procedures for the proper handling, storage and disposal of hazardous wastes. Materials that cannot be landfilled or put into a waste treatment system must be sent to a hazardous waste treatment facility. Minnesota Code of Agency Rules, chapter 7045 lays out the specific requirements, based on

the RCRA legislation. Generators must evaluate their wastes for hazardous substances and must store it in proper containers and in safe locations. They also must label the containers and keep records on the materials. Use of a licensed transporter, proper training of employees and an emergency response plan are also required.

Permits for facilities and licenses are issued for generators in Minnesota by the Pollution Control Agency and the relevant county for generators in seven metropolitan counties. Each agency maintains records of violations of the Minnesota hazardous waste rules and uses different methods of identifying paper work violations separate from waste storage and disposal violations. The methods range from paper files on each physical site to electronic database files. The separation of critical or substantial violators also varies — from a list of 20 critical violations to enforcement action to a list of misdemeanor and felony charges.

Minnesota tracks the management of hazardous waste for about 15,000 facilities, about one-half of which are in the seven-county metropolitan area. The state maintains a database of violations for all but the seven metropolitan counties by the type of enforcement action taken. The violations are recorded by a site's location as required by the Environmental Protection Agency (this makes it easy to incorrectly attribute a violation to the business currently located on a site.) The state does not keep a running record of changes of the businesses on a site.

The state uses penalty codes to indicate the severity of a violation and a facility's timeliness in taking proper corrective action. If a facility is notified to correct a violation and complies, no further action is taken. If a facility fails to respond to repeat requests, an Administrative Penalty Order is written. If further action is required, a Stipulation Agreement, whereby the facility agrees to corrective action and pays a fine, may be written. In some cases, the facility will be required to perform additional work that will benefit the environment and the community at large. These are the Supplemental Environmental Projects.

The hazardous waste information systems of the seven metropolitan counties range from practically nonexistent to sophisticated. This inconsistency made the use of metropolitan hazardous waste information in evaluating a company's environmental performance spotty and difficult, at best.

Anoka, Carver, Dakota, Ramsey and Scott counties provided no usable information about violations. The project was able to review three databases: state administrative penalty orders (civil and criminal penalties), Hennepin County misdemeanor and felony charges, and Washington County critical violations.

Sixteen businesses had 51 violations and also received aid for business development, with one business incurring 20 violations at four separate locations. Nine of the companies incurred violations three or more years prior to receiving funding, and three had violations a year before receiving funding. The remaining four had violations the year of, or year after receiving funding.

Emergency spills and releases: The Pollution Control Agency requires facilities to report any spill or release of materials that may be harmful to the environment or to human health. The spills and releases report includes self-reported, citizen-reported and agency-reported spills and releases. Any citizen can call in a suspicion of illegal dumping or release of materials to the air, water or land. The database includes 19,036 records in the last ten years, and includes reported accidents but often without the specific type of material or quantity released.

The information does not represent a violation as with the other databases analyzed. The Pollution

Control Agency does follow-up with investigations and creates a much shorter violation list. The project did not receive that list in time to be evaluated in this study.

The value in reviewing spills and release information is to note facilities that have continual problems with releases, facilities that may have only occasional releases (such as from a traffic accident), and facilities that are in aggregate at risk for releases and as a group might warrant incentives to mitigate those releases. The data may also be useful in evaluating a facility's pollution prevention record or its commitment to reducing accidents.

The project reviewed data covering all of 1989 through 1998 and January and February of 1999. Examination of the 19,036 records, revealed 45 companies that also received aid between 1996 and 1998. A number of the records were for one-time accidents or leaks while removing an underground storage tank. A number of other facilities had a particularly high number of releases.

Multiple violations: Seven companies that received public funding for economic development had violations in two or more of the pollutant areas of water, air, hazardous waste, and accidental spills and releases. Of the seven, only one had all of its violations (34) before receiving aid. Two businesses had a large number of total violations, one at 110 and another at 219 (and 72 reported spills). Although a third company had only three water and six hazardous waste violations, it reported 90 spills through February 1999.

This study showed that a small, but significant percentage of companies receiving development aid had less than stellar environmental performance. It showed, too, that state and local agencies often do not make the connection with environmental performance when considering business aid, and that the information system and procedures needed to make such cross-checking easy do not exist. The short-term goal is to connect business aid with a serious consideration of environmental performance. The long-term goal is economic development that benefits the environment and communities as a matter of course.

ENSURING CLEAN, SAFE AND RELIABLE TRANSPORTATION

Ensuring clean, safe and reliable transportation

Minnesota needs a gas tax that takes into account more than just funding for highways and roads. Known officially as the Motor Fuels Excise Tax, the gas tax was designed in the first part of the 20th Century. But, this study shows it will not fit Minnesota's needs in the next century.

As structured, the tax fails to take into account:

- Increased fuel efficiency of cars that, in turn, generates less money for road repairs despite heavier use of our highways and roads
- Environmental damage, namely air pollution, from our widespread dependence on gasoline
- Economic instability that is likely to develop as gas supplies are depleted and prices rise
- Transportation problems of low-income urban and rural citizens who need cars to hold down jobs, but can't afford to buy or operate them
- An aging population likely to need transportation alternatives

Although there is a growing consensus that the current formula should be changed, no agreement exists on the goals for a reformulated tax. This study suggests our policy should be formulated to make transportation more affordable, rather than making gasoline cheap, and to ensure that the fuel for our transportation system is safe, clean, available and reliable.

To help meet that goal, policies should be adopted that require motor fuel users to pay the full cost of road use and environmental damage. Minnesotans, like most Americans, are accustomed to cheap gas. However, the longer we keep the current tax structure, the more difficult it will be to wean ourselves from the current unsustainable pattern.

Underlying our comfort in depending on gas is the assumption that technology will provide an easy fix once we run out of gas. Though gas shortages seem remote at the moment, responsible and sustainable policy demands that we seek solutions to this inevitable problem sooner rather than later.

This study examines how the gas tax affects our economy, environment and community life and looks at ways to configure the tax so it supports sustainable development.

What does the gas tax do?

Minnesota first enacted a gas tax (two cents per gallon) in 1925. Currently, the tax is set at 20 cents a gallon, though the rate is lower for ethanol, methanol and other fuels. Other states have gas taxes ranging from 7.5 to 38 cents per gallon. Minnesota's gas tax was last increased in 1988.

> *The sophistication of today's roadway system, and the vehicles that use it, have outgrown the usefulness and equity of the gas tax as the primary source of revenue for its development and maintenance.*
> — Minnesota Department of Transportation, 1997

The tax applies to virtually all vehicles. The only exemption is for transit systems receiving state assistance. In Minnesota, gasoline is also exempt from the 6.5 percent sales tax. But that is not unusual. Only seven states impose a general sales tax on gas.

Nearly all of the revenues generated by the gas tax go into various funds for road construction and repair. Besides state highways, some local roads receive this money. The formula for distributing the gas tax is laid out in the state Constitution, which makes it extremely difficult to change.

All told, the gas tax currently pays for about 25 percent of Minnesota's road costs. This has not changed significantly in at least five years. At the same time, property taxes and parking revenues pay for the upkeep of municipal streets and local roads. Local dollars pay for about 40 percent of Minnesota's road construction and maintenance costs. The other 35 percent comes from vehicle license fees.

Roads supported by the gas tax comprise only 36 percent of the total road mileage in Minnesota but they carry nearly 90 percent of the traffic. Conversely, local streets and roads — those not funded with state aid — make up 64 percent of the road miles, but carry only 11 percent of the traffic. The gas tax funds the most heavily traveled roads and there is not a massive subsidy from the general fund or from property taxes.

Assessing the current gas tax

To date, no generally accepted principles exist for a sustainable development tax. Though 10 characteristics of sustainable development policies were outlined by the Minnesota Round Table on Sustainable Development, more specific guidelines are needed to develop a sustainable gas tax.

In the absence of generally accepted principles, the Economics for Lasting Progress project used goals based on *Minnesota Milestones 1998: Measures that Matter* to assess whether a policy supports sustainable development. This study assessed the motor fuels tax against these goals.

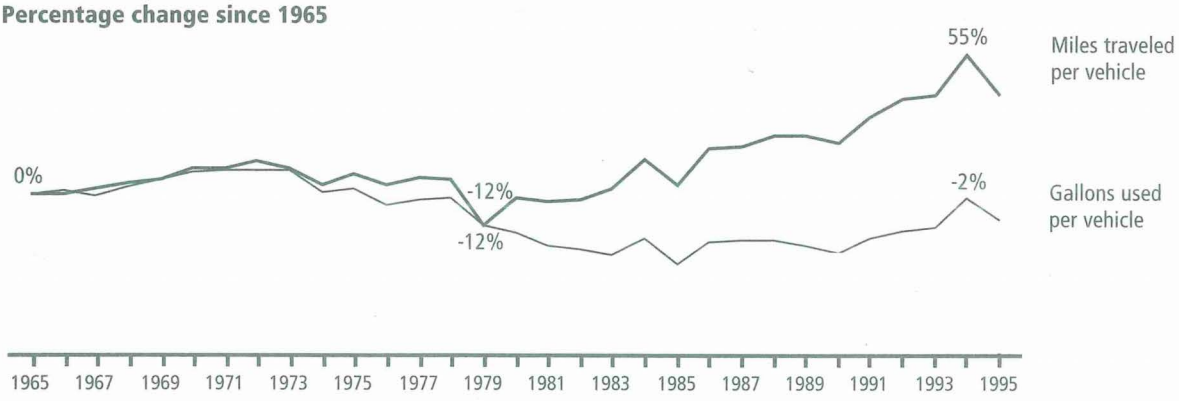
Goal 1: Minnesota will have sustainable, strong economic development.

Indicators that measure the efficiency of our current transportation system show mixed results. In terms of keeping the economy going, we have become more efficient. During the past several decades, we consumed less gasoline per dollar of gross state product, but traveled slightly more. This resulted mainly from increased fuel efficiency. In fact, fuel efficiency, as measured by gallons of gasoline per dollar of the gross state product, increased 29 percent between 1977 and 1997. At the same time, vehicle miles traveled per dollar increased only 3.5 percent.

Overall, fuel consumption per vehicle dropped 11 percent while the number of miles a typical car traveled increased by 39 percent between 1965 and

GAS TAX REVENUE DOES NOT KEEP PACE WITH TRAVEL

Percentage change since 1965



Since 1965, miles traveled per vehicle have increased while gasoline consumption per vehicle has decreased. The result is less revenue, while wear and tear on roads increases.

Source: Minnesota Department of Public Service

1995. This creates a mixed bag. We consume less gas per vehicle but use our roads more. Heavier road use means more repairs and more congestion.

Congestion is an efficiency concern because it affects travel time. If congestion increases as expected, particularly in the Twin Cities metropolitan area, the "time cost" may become higher. This is a relatively new concept so no data exists to measure time cost. Nevertheless, as congestion increases, we will spend a lot more time in our cars; it is impossible to predict what effect this may have on the economy.

Goal 2: All Minnesotans will have the means to maintain a reasonable standard of living.

The current gas tax works against this goal. The highway system is the main infrastructure providing access to jobs, education, shopping, recreation and social opportunities throughout Minnesota.

That means the cost of gasoline is a significant part of most Minnesotans' household budgets. The financial burden on households, however, varies by county and depends on miles driven and household income.

With gasoline at $1 per gallon, 40 counties showed households spending more than 6 percent of their 1995 median income on gasoline and 10 counties showed households spending more than 8 percent of median household income on gasoline. In general, households in the more rural areas of Minnesota spend a larger proportion of their budgets for motor fuels than those in metropolitan areas. Consequently, residents of rural Minnesota are most vulnerable to gas price increases.

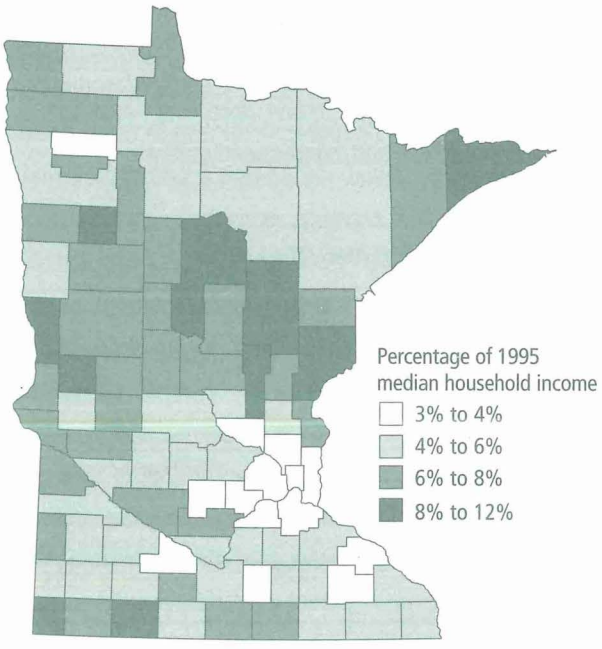
Minnesotans in the top income brackets use more gas, and consequently pay more taxes, while those in the lower-income levels pay less in gas tax, but the tax constitutes a higher percentage of their income.

Relatively speaking, gas is cheaper now than it was 30 years ago. Between 1965 and 1995, the price of gas dropped 21 percent, after adjusting for inflation.

Despite the low cost, price still affects consumption, though Americans are not as sensitive to gas price changes as consumers in other countries. Overall, however, gas consumption per capita has remained relatively level during the past 30 years even though Americans travel more miles.

Studies reviewed for this analysis showed that, on average, a 1 percent increase in gas prices led to a 0.5 to 0.7 percent decrease in demand. Only one-third of that reduced demand can be attributed to a reduction in miles. The rest is due to improved fuel efficiency. In other words, increased gasoline prices are likely to result in a decrease in gasoline consumption but not in a significant reduction in miles traveled.

ESTIMATED GASOLINE EXPENDITURES PER HOUSEHOLD



Rural Minnesota residents tend to spend a higher percentage of their income on gasoline.

Source: Minnesota Planning

Goal 3: Rural areas, small cities and urban neighborhoods throughout the state will be economically viable places for people to live and work.

The current gas tax works against this goal. Our current transportation policy, which emphasizes highway travel, provides for a convenient means of travel for most adults who have cars. It does not, however, afford the same level of accessibility to all citizens.

As a result, even though the state currently has extremely low unemployment, some citizens have a hard time getting to and from jobs. Additionally, the aging population is likely to need more and better alternatives to driving.

With increased fuel efficiency, travelers use less gas. The result is that gas tax revenues — per vehicle mile traveled — dropped 27 percent between 1975 and 1995. Thus, the gas tax has become a less reliable means of paying for road construction and repair, according to the Minnesota Department of Transportation.

At the same time, motorists travel more. That translates into heavier road use and, consequently, more construction and repairs. This, in turn, means more money must be spent to maintain the transportation system.

Increased road use also brings demands for new roads. Although the current revenue system does a reasonably good job of supporting road maintenance, it does not generate enough money to significantly expand the highway system. In the last 20 years, the number of lane miles increased 1.5 percent though travel went up by 50 percent.

The result is increased congestion, mostly in the Twin Cities area. Even if the gas tax provided lots of money for new roads, the prospect of building even more roads in the metropolitan area to keep pace with increasing demand is unrealistic because of social and environmental limits. Consequently, the state should seek other ways to reduce congestion besides road construction.

Goal 4: Minnesotans will conserve natural resources to give future generations a healthy environment and strong economy.

The current gas tax works against this goal. Gasoline is a finite resource that eventually will be depleted. As supplies decrease, prices will rise. No one knows

GASOLINE PRICES HAVE DECLINED

After a steep increase in the late 1970s and early 1980s, gas prices have fallen when adjusted for inflation. The gas tax has remained fairly constant. The data has been adjusted for inflation using 1997 dollars.

Source: Minnesota departments of Public Service and Revenue

exactly when the supply will shrink enough to create economic disruption.

To make matters worse, we are increasingly dependent on foreign oil. In 1996, the United States imported 46 percent of the petroleum we consumed, up from 35 percent in 1973. Relying so heavily on imported fuel makes us increasingly vulnerable to supply disruptions and price shocks. Such a dependence at the state and national levels sets the stage for significant social disruptions. Eventually, gasoline will be in short supply in one of two ways. Gas will be rationed by price if we rely on the market or by scarcity if we turn to price controls and increased regulation.

The structure of the current gas tax does not encourage us to move away from this unsustainable behavior. In short, it does not force us to address the troubling question: What happens when we run out of gasoline?

Goal 5: Minnesotans will restore and maintain healthy ecosystems in support of a healthy economy.

The current gas tax works against this goal. Scientists are in general agreement that the use of gas at current levels harms the environment and public health. These adverse effects include such things as asthma and other respiratory illnesses, reduced visibility and global warming. The most widely reported human health effects and ecological damage are caused by airborne emissions, which are a byproduct of gasoline combustion.

Minnesota's air quality is improving despite greater highway use. Between 1985 and 1994, ground-level ozone — a major component of smog — dropped 8.6 percent. And, carbon monoxide emissions decreased by 21 percent during the same period. In both cases, much of that improvement is due to vehicles burning less fuel and cleaner engine technology.

Overall, air pollutants from highway vehicles decreased 32 percent between 1985 and 1994, even though vehicle miles traveled nearly doubled. Even so, air pollution resulting from highway use remains a problem. In 1994, about 70 percent of the carbon monoxide emissions came from highway vehicles, amounting to about 1.2 million tons of carbon monoxide being released into the air in one year.

We should also note that Minnesota's growing population and strong economy (which means more travel, more vehicles per household and less fuel-efficient vehicles) are expected to result in more vehicle miles traveled. And, without further technology improvements, it is unrealistic to expect that total emissions will continue to decline.

Moreover, if ground-level ozone in the Twin Cities area were to consistently exceed federal standards, Minnesota could lose federal funding for highways. This happened to Atlanta in 1996 when federal officials told regional planners not to expect any more federal transportation money until the region complies with federal clean air standards.

Greenhouse gases are another major environmental consequence of gasoline combustion. There is general scientific consensus that human activities increase concentrations of greenhouse gases in the atmosphere and that higher concentrations of these gases are heating the planet. Scientists are uncertain how these climate changes will affect specific regions over the next several decades.

The major greenhouse gases are carbon dioxide, methane, nitrous oxide and chlorofluorocarbons. Of these, carbon dioxide accounted for more than two-thirds of Minnesota's total greenhouse gas emissions in 1990. Motor fuel (almost entirely gasoline) emissions constituted 24 percent of the total.

Some economists are attempting to assign a financial cost to the health and environmental damage caused by air emissions. Cost estimates of gasoline emissions damage in studies reviewed for this paper range from $0.13 per gallon to $7.39 per gallon. Disregarding the extremes, the mean value in these studies was $1.21 per gallon. That amounts to an estimated $3.2 billion in damages each year.

Reconfiguring the gas tax

Several options for reconfiguring the gas tax are briefly outlined here. Changing the current system would result in different "winners" and "losers." Change is likely to create controversy and resistance, which suggests that any new policy include a transition period. The policy options are:

Taxes based on environmental damage: A gas tax should reflect costs imposed by the use of motor fuels. At the very least, the tax should be set at a level that incorporates some measure of environmental damage caused by gasoline combustion. Since environmental effects vary greatly by location, further study will need to be done to determine the appropriate level for a state tax. Residents with lower incomes would be hit hardest by such a tax.

Depending on the level of such an environmental tax, it is possible that gas consumption would decline. Consumers would have to reassess how best to meet their transportation needs. Their options would include reducing travel, shifting to cleaner fuels or using mass transit.

If this approach were adopted, it would be important to determine how additional revenues would be used. A logical use would be to reduce our dependence on gasoline. To do this, we could increase the availability and attractiveness of transportation alternatives, such as non-gas vehicles and mass transit. Such an approach would be particularly important for those with lower incomes and those who live in greater Minnesota since increases in gasoline prices would adversely affect these households.

It is important to note that many technological, infrastructure and financial barriers would need to be overcome if there were a widespread shift from gasoline. In searching for solutions, the state should not simply embrace one technology without evaluating the long-term repercussions of other choices. A number of strategies might be considered in state policy discussions. Some examples are:

- Alternative fuels infrastructure: If the decision were to promote vehicles that use alternative fuels, such as electric or fuel-cell powered cars, then investments in infrastructure would need to be made to smooth the transition.
- Alternative fuels/alternatively fueled vehicle research and development: The state may also wish to support research and development of alternative fuels or new vehicle designs to make their prices more competitive with current technologies.
- Consumer incentives: Incentives could entice consumers to buy vehicles that use alternative fuels to help build a market and support system for new vehicles.
- Transit: The state may want to increase the availability and affordability of transit options throughout the state.

Sales tax: Motor fuel sales could be included in the sales tax base. In 1999, the Department of Revenue estimates that the current sales tax exemption for motor fuels costs Minnesota about $231 million in lost revenues. The current exemption of motor fuel sales from the general sales tax emphasizes affordable gasoline rather than affordable transportation.

This option also raises the question of what would be done with the money. Currently, sales tax revenues go to the general fund. Policymakers would need to decide if the tax revenues from motor fuels should be used differently.

Mileage-based charges: Some negative effects of automobile use, such as congestion or inefficient use of land, can be caused by cars regardless of what fuel they use. These effects would be better reflected in a mileage-based charge than in a fuel tax.

Since 1965, total vehicle miles traveled have risen by 157 percent. There is no doubt this heavier use of roads has caused congestion. At the same time, increased vehicle fuel efficiency means total gasoline consumption has increased only 65 percent. As a result, the relationship between gasoline consumption and road demand has weakened considerably.

This option would make our road funding system more clearly dependent on user fees, since road needs would be linked to miles traveled rather than to gasoline use. It is important to remember that as fuel efficiency continues to improve and alternative fuels become more popular, road usage will not necessarily decline.

The Minnesota Department of Transportation and Metropolitan Council have investigated this option and raised several issues, such as privacy concerns and the effects on Minnesota's economic competitiveness with regard to implementation, program administration and public acceptance.

Recommendations

In order to ensure that Minnesota continues to provide clean, safe and reliable transportation well into the future, *Smart Signals* makes the following recommendations:

The gas tax should be set at a level such that it pays for environmental damage created by the use of motor fuels and promotes the use of clean transportation technologies. To determine an appropriate level for the tax, the effects of factors such as climate, topography and congestion must first be calculated on emissions in local areas. A model specific to Minnesota should be developed to determine an appropriate level for the tax. The long-term goal of the tax should be to ensure that market prices fully incorporate the total cost of transportation choices. Revenues from the pollution tax should be used to fund research and increase availability of cleaner transportation options.

Motor fuels should also be assessed the state's 6.5 percent sales tax. Exempting gasoline from the general sales tax runs counter to sustainable development principles. The goal should be to make transportation more affordable, not to provide cheap gasoline. The policy also should ensure that our transportation system is safe, clean, available and reliable. Instituting these policies would be a significant shift that should be phased in over a number of years to ensure an equitable transition. The shift could be costly, particularly to residents of rural Minnesota since households in these areas would need to devote a larger portion of their income to transportation.

The cost of building and repairing roads should be shifted from fuel- and vehicle-based charges to travel-based charges. In the long run, road funding should be more closely linked to the users of the roads through mileage charges for state-funded portions and through property taxes for the locally funded portions of the transportation network. Since a goal of a sustainable development tax policy should be to reduce reliance on fossil fuels, linking road funding to a declining revenue base, like gasoline sales, makes no sense. The technology exists to make this shift. However, studies have indicated that considerable public opposition would be encountered.

MAKING HOME HEATING AFFORDABLE

Making home heating affordable

Minnesota should change its home heating fuel policy to encourage energy conservation, reduce pollution and lower heating bills for the state's households.

To date, the state's policy has been to emphasize one *method* — making heating fuels affordable — rather than the *goal* of ensuring that heating remains affordable for all Minnesota households. This has been done largely by exempting home heating fuels from the state's 6.5 percent general sales tax.

This study examined current state policy using a sustainable development framework. Home heating policies were evaluated in terms of their effects on the environment, the economy and the social climate of the state. The study also asked: Could the state get a bigger bang for its buck by applying sustainable development policies to home heating?

The answer is yes. This analysis showed that exempting home heating fuels falls short of meeting several important criteria of sustainable development policies. Making heating fuels cheaper does not encourage energy efficiency. In the long run, *increasing the potential to conserve energy* — a sustainable development goal — would do more to improve energy efficiency, reduce pollution and ensure affordable energy.

But, if such a change would bring state policy more in line with sustainable development principles, it must be justifiable in economic terms as well. In other words, how much money would we have to spend and on what programs to achieve real environmental and economic benefits? The answer lies in which technologies are subsidized and at what level.

For example, a family that installs a setback thermostat, upgrades its gas furnace to a high-efficiency model and adds attic insulation could save about $168 the first year and nearly $5,000 in energy costs over 20 years.

> *Because utility bills are a substantial part of family budgets, residential building energy use affects what kind of housing we can afford and how comfortable and healthy we are at home.*
>
> *— National Energy Policy Plan*
> **U.S. Department of Energy, 1995**

Our current policy

Home heating fuels have been exempt from the sales tax since 1978. Although no record of the rationale exists, the exemption is consistent with not charging a sales tax for such other essential goods as food and clothing.

Excluding heating fuels from sales tax effectively lowers the price. For instance, a household that spends an average of $100 per month on heating during a six-month heating season would save $39 in taxes. This is money a family can spend elsewhere.

But it costs the state money. The Minnesota Department of Revenue estimates that the sales tax exemption on heating fuels will cost Minnesota taxpayers approximately $80 million in lost revenue in 1999.

Other states have a variety of tax treatments for heating fuels. Wisconsin, Ohio and Missouri exclude heating fuels from sales taxes, while Iowa includes them in its sales tax base. North Dakota does not tax the sale of electricity, but other heating fuels are subject to sales tax. Michigan taxes utility services at a rate lower than other goods and services.

Over the past several decades, Minnesota's residential energy use increased by 30 percent. Natural gas still accounts for about 60 percent of the total. Electricity consumption, which has increased 210 percent, now comprises nearly one-quarter of household energy consumption. Petroleum-based fuels (liquefied petroleum gas and fuel oil) currently make up less than 16 percent of residential fuel use, a marked decline in the last 30 years.

Except for electricity prices, which declined nearly 40 percent between 1965 and 1995, real energy prices are essentially the same in 1995 as they were in 1965, despite significant fluctuations.

Deciding where to invest our money

One alternative to the tax exemption for home heating fuels is to charge the sales tax and use the money to encourage households to make energy efficiency improvements. Increasing a household's energy efficiency reduces utility bills as well as decreases power plant emissions, which benefit the public at large.

This study compared the costs and benefits of various residential energy efficiency technologies that apply to home heating. These technologies include: high-efficiency gas boilers, high-efficiency gas furnaces, heat pumps, attic insulation, wall insulation, basement insulation, setback thermostats and high-efficiency

CHANGING RESIDENTIAL FUEL SOURCES

Number of BTUs in trillions

Natural gas and electricity use by households is increasing, while nongasoline petroleum-based fuel use is on the decline.
Source: Minnesota Department of Public Service

SAVINGS DEPENDS ON WHAT IS COUNTED

Continuing the sales tax exemption

	Costs	Benefits
PRIVATE	Homeowners pay full cost of standard technology	Increased purchasing power from savings on tax exemption
PUBLIC	Loss of revenue to state; Continued carbon emissions (costing $3 to $40 per ton)	None

Incentives for energy efficiency

	Costs	Benefits
PRIVATE	Lower cost of energy efficient technology	Increased purchasing power from energy savings
PUBLIC	Subsidy by the state (costing $37.50 to $300, depending on technology)	Increased tax revenue from ending exemption; Reduced carbon emissions (valued at $3 to $40 per ton)

Estimates of the differences between policies depend on what is counted in the analysis. Understanding the assumptions behind the numbers is crucial to evaluating the strengths and limitations of the analysis.

Source: Minnesota Planning

windows. The study estimated the net savings (total benefits less total costs) of each alternative over one-, 10- and 20-year periods.

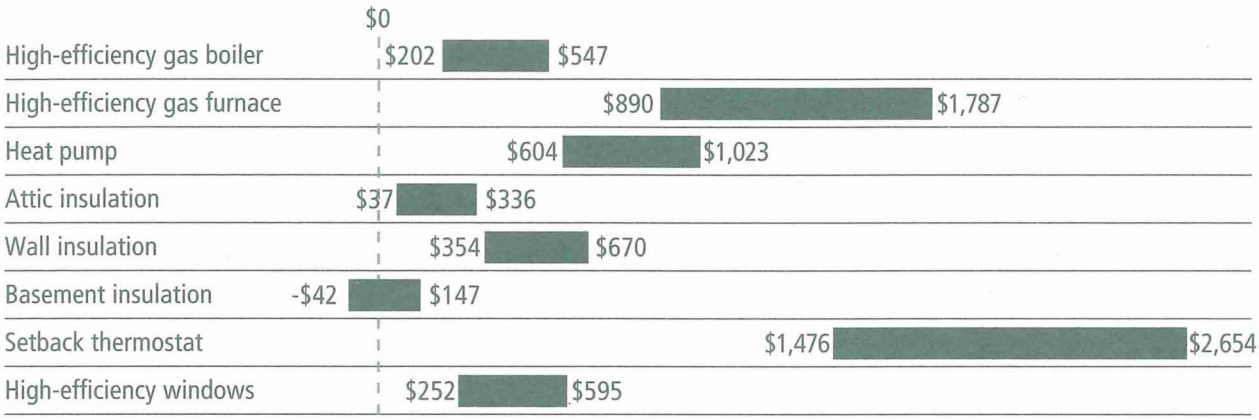
The net savings of each alternative varies considerably depending upon the time frame, discount rate and whether the benefit is calculated from the perspective of the individual household or society in general.

Generally, each technology shows higher net savings with a lower discount rate and a longer time period. The study also found differences between the level of savings for an individual household and savings realized by society for the various alternatives.

What's the timeframe? Some energy-efficient technologies do not pay off immediately since the up-front cost is not immediately recouped. Typically, the payoff — money saved by households and decreased pollution — is realized over time.

This analysis showed all the major technologies could save money over a 20-year period. When the investment payback period is reduced to 10 years, high-efficiency boilers, heat pumps, setback thermostats and high-efficiency windows are most likely to yield net savings. When the payback period is limited to one year, only high-efficiency boilers and setback thermostats show potential net savings, and those are relatively small.

CONSERVATION SAVINGS OVER 20 YEARS VARY BY TECHNOLOGY (IN MILLIONS)



Conservation is likely to pay large rewards over the long-term.
Source: Minnesota Planning

LONG-TERM SAVINGS DEPEND ON DISCOUNT RATE

Estimated 20-year savings for attic insulation

The level of savings from an efficiency policy depends on the rate of return on other investments (discount rate).
Source: Minnesota Planning

Making the case for state involvement: The study estimated total costs and benefits accruing to households and society at large. Costs and benefits were determined to be either public or private, depending on where the biggest burden fell.

For some energy conservation technologies, most benefits are realized by the larger society. Thus, sound public policy may require giving financial incentives to individual consumers so they invest in the conservation technology.

Under this criterion, all technologies show public net savings exceed private net savings over a 20-year time frame. This finding suggests that consumers may not have sufficient incentive to undertake conservation improvements.

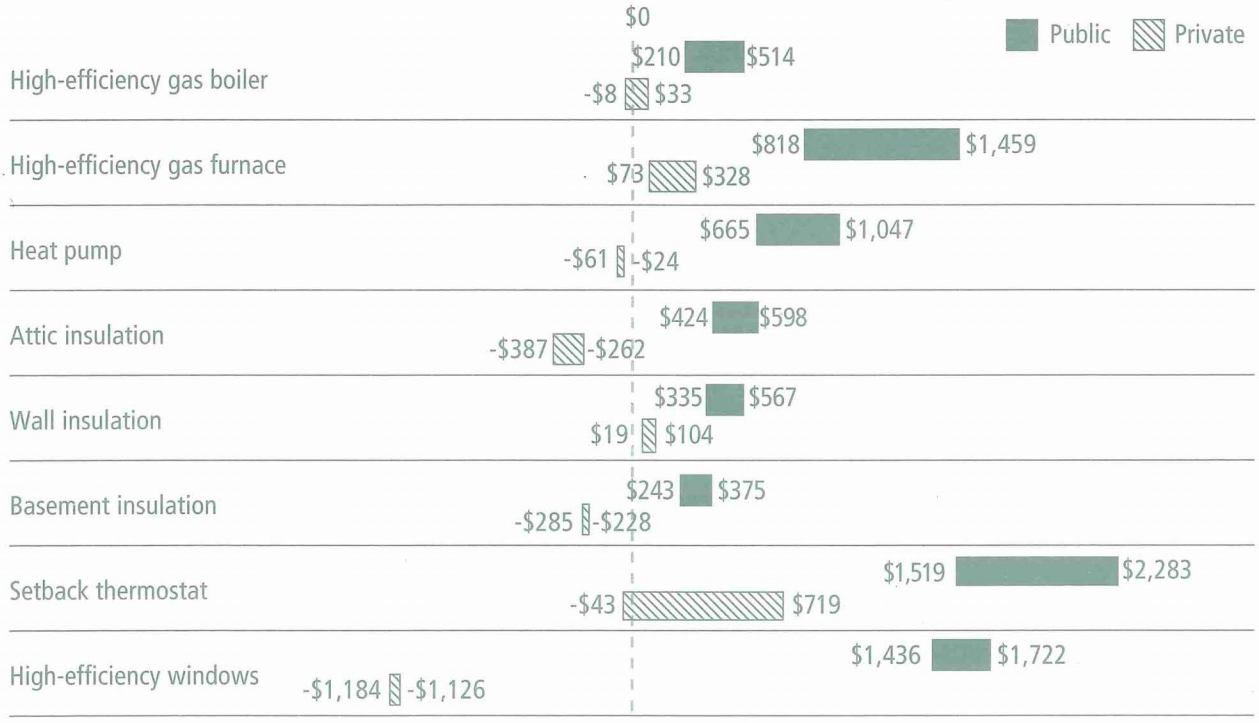
Opportunity costs: Any decision to invest money in a particular program means that the money is not available for investment in other things that may have resulted in a greater return. The opportunity cost of the investment, also known as the discount rate, should be reflected in the cost-benefit analysis.

Selecting an appropriate discount rate is more of an art than a science since it is impossible to know what the real opportunity cost of the investment will be. Since state monies are generally put in fairly low-risk investments, a discount rate should reflect the low-risk nature of alternatives. Generally, the lower the expected discount rate, the greater the savings potential.

Different decisions produce different winners

Due to the regional variations in heating fuel preferences and housing age, variations in the applicability of different conservation technologies should be expected.

PUBLIC SAVINGS OUTWEIGH PRIVATE SAVINGS (IN MILLIONS OVER 20 YEARS)



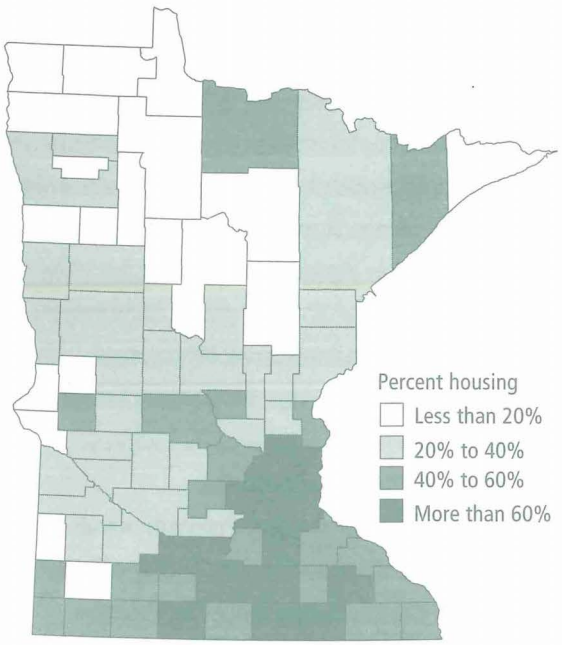
Under the proposed policy, individuals may not realize a savings on all energy conservation improvements, but the public will see significant savings because the state will not continue to lose tax revenue.

Source: Minnesota Planning

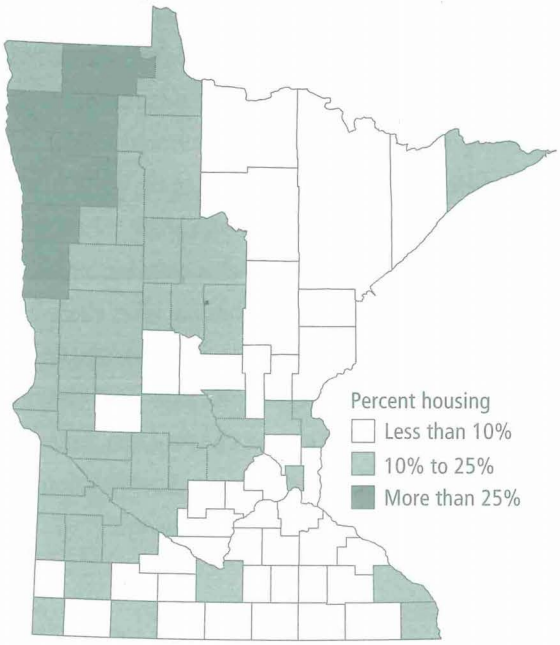
HOME HEATING USE VARIES ACROSS MINNESOTA

Regional differences in the fuels used to heat homes and differences in the age of the homes, mean that not all conservation technologies will be equally applicable throughout the state. Upgrades to more efficient boilers and furnaces are appropriate for households statewide — natural gas in the most urbanized areas, fuel oil in greater Minnesota. Electric heat pumps can reach the more rural areas of the state. Incentives for insulation and energy efficient windows would be most beneficial for older homes, which are heavily represented in rural areas. Incentives for setback thermostats would be beneficial across the state.

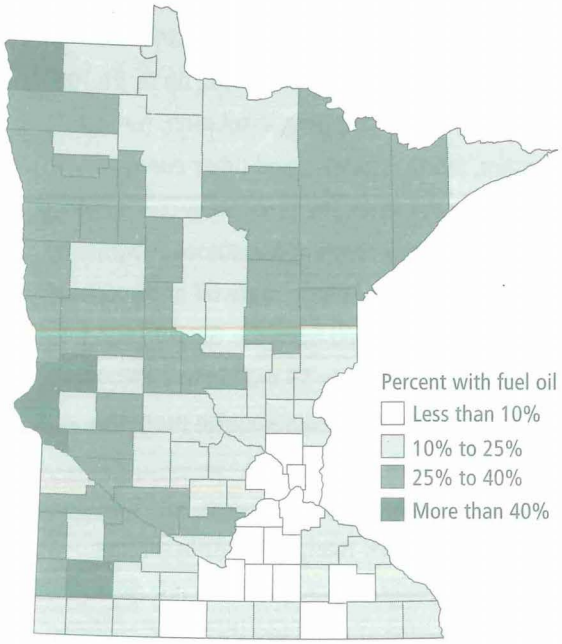
Housing units with gas heat



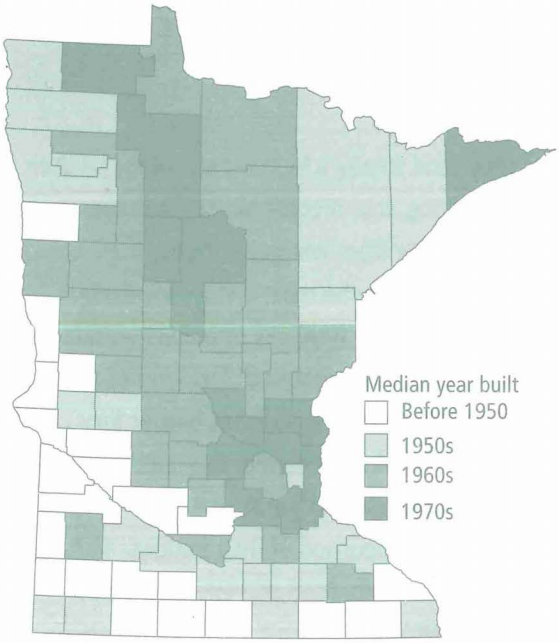
Housing units with electric heat



Housing units with fuel oil heat



Median year housing units were built



Source: Minnesota Planning

Natural gas is the heating fuel of choice for Minnesota's more heavily urbanized areas. Other areas where there is a high use of natural gas include the southern half of the state and Lake, Koochiching and Stevens counties, according to the 1990 census data. As a result, subsidies for boilers and furnaces would reach more households in these areas.

Electric heat is used more heavily in western Minnesota, particularly the northwestern section of the state where up to 35 percent of households rely on it. In these areas, subsidies of heat pumps would reach more households.

Heating homes with fuel oil does not require an extensive pipeline network for distribution and tends to be heaviest in northern and western Minnesota, areas which are more sparsely settled. Since fuel oil is only rarely, if ever, installed in new construction, areas where fuel oil is used also tend to have older housing stock than areas with heavy natural gas usage.

In general, counties in western and southern Minnesota, as well as the older core cities, had the oldest housing stock (as measured by median year constructed). This makes these areas likely to see the most benefit from improvements such as insulation and high-efficiency windows.

Because they tend to pay a higher percentage of their income for heating, low-income households can benefit significantly from energy efficiency improvements. To save the most energy for these citizens, replacing older furnaces or boilers with more efficient models, is often required. This kind of up-front investment can be a significant barrier for low-income households. Generally, low-income households tend to:

- Spend a higher proportion of their budgets on such critical needs as housing, food and energy than do higher-income families
- Purchase goods and services that meet short-term needs, thus avoiding larger expenditures that may have long-term benefits
- Purchase fewer durable goods than do other households

Currently, data is not available to determine the economic effects of various energy-saving technologies for different income groups.

Learning from existing programs

A cost-benefit analysis shows that shifting state dollars from the home heating fuels sales tax exemption to energy efficiency investments could produce both a net economic benefit for the state and a tax policy more oriented to sustainable development.

One question needs to be answered: Who would administer these energy-savings programs? Currently, Minnesota has a variety of programs that address residential energy efficiency. These are:

- The Conservation Improvement Program mandates that utilities spend money to improve energy efficiency. However, industry restructuring makes its future uncertain.
- The Weatherization Assistance program is administered by the Department of Children, Families & Learning and local Community Action agencies. The program offers free material and labor, up to $1,200 for caulking, weather stripping, insulation, furnace replacement, storm windows and other energy efficiency improvements. The program receives money from the Low-Income Heating Assistance Program in the U.S. Department of Energy, state oil and propane taxes and about $500,000 from the General Fund. Total funding was approximately $9 million in 1996. Many utilities complement this program with programs and funds of their own.
- Rebates on heating systems, boilers, and insulation are currently offered by many Minnesota utilities. Although utility programs are probably not appropriate venues for dispersing state funds, their high visibility

with consumers may provide lessons for the state in setting up such programs.

- Energy building codes affect only new construction or major rehabilitation projects. Based on the analysis contained in this report, increasing energy-efficiency standards beyond levels specified in the current building code would not produce savings sufficient to make this a high priority.
- Home energy rating systems can help consumers identify and compare operating costs associated with new houses or substantial retrofits, much as appliance energy labels help consumers compare major appliances. States have set up these programs differently around the country. The program does not currently exist in Minnesota.
- Minnesota Housing Finance Agency's Home Energy Loans are offered by more than 400 financial institutions.
- The Metropolitan Airports Commission provides sound insulation, and consequently energy-related improvements to houses within noise contours of the airport.
- Energy efficient mortgages are offered to homeowners for new energy-efficient homes or substantial renovations of existing homes. The Federal Housing Administration offers loans with increased debt/income ratio ceilings based on the assumption that lower utility bills free more money for mortgage payments.

The existing programs may or may not make good vehicles for administering energy conservation incentives. However, further examination of programs that exist in Minnesota and elsewhere can provide important lessons for administration, marketing and implementation of conservation programs.

DEVELOPING A CERTIFIED WOOD INDUSTRY

Developing a certified wood industry

Minnesota's local and state governments should provide incentives to certify the state's forests — a process that will enhance the state's economy, environment and quality of life.

Without question, Minnesota's 16.7 million acres of forests are highly valued. What's more, the economic vitality of many Minnesota communities situated near forests is directly related to the health of these woods. Many cities and towns in northern Minnesota rely on timber harvesting, lumber and paper mills, furniture manufacturing or tourism for jobs and revenue.

At the same time, our forests contain precious wildlife habitats and offer natural absorption qualities that help clean the environment. Given expanding populations, there is little doubt that demands on forests in Minnesota and elsewhere will grow.

To preserve these valuable resources for future generations, a movement has developed to "certify" forests worldwide. Forests can be certified if an independent party identifies them as being managed and harvested to meet various social, economic and environmental guidelines.

The certification guidelines call for such things as protecting cultural sites from harvest, banning certain pesticides and limiting other pesticides to certain areas or specified times.

In this state, the Minnesota Forest Resources Council recently issued a number of voluntary forest management guidelines for the same purpose. These guidelines are similar to international certification standards developed by the Forest Stewardship Council, an umbrella certification organization based in Oaxaca, Mexico.

> *By the end of 2002, we will eliminate from our stores wood from endangered areas and give preference to "certified" wood.*
> — Home Depot President and CEO Arthur M. Blank

The incentive for timber companies to adopt these practices is that they can label and market their products as coming from certified forests. The downside to certification is that following these standards means higher production costs — up to 20 percent — for the timber industry. So far, the demand for certified wood has been strongest in Europe. In recent years, however, demand for certified wood has grown significantly in this country.

The benefits outweigh the costs

This study recommends that Minnesota's local and state governments enact policies that support the forest certification process and make it attractive to foresters. Why? There are several reasons:

Benefits should ultimately outweigh costs. Despite the lack of empirical data and an extensive amount of experience to draw from, it appears that the environmental, economic and community benefits of certification outweigh the costs in the long run. Particularly important are the likely environmental and social benefits for communities. This finding is supported not only by this study's cost-benefit analysis and experiences to date, but also in part by the belief of many in the industry that the concept of certified wood will ultimately take hold.

The citizens, environment and economy of Minnesota stand to gain. Who pays for certification and who benefits? While timberland owners, forest managers, harvesters and wood product manufacturers would pay most of the costs, the benefits would be spread out among tourists, the

tourism industry, cities and counties with forest industries and the state. So, the public has much to gain from certified forests.

Minnesota can get a head start on a relatively new market. Because the certified wood industry is still in its infancy and demand currently outweighs supply, Minnesota is in an excellent position to take the lead, to make sure that jobs and economic growth related to this industry stay in Minnesota. Failing to take advantage of this opportunity simply means someone else will seize it, and Minnesota will lose that competitive advantage.

The certified wood industry can create jobs and economic growth in an area that needs it most. Though Minnesota's economy has grown rapidly in the last few years, some parts of the state are not experiencing equal economic success. In 1997, the unemployment rate in the top 10 timber-producing counties was nearly twice the state's average. Minnesota's top 10 timber-producing counties are: St. Louis, Koochiching, Itasca, Beltrami, Cass, Lake, Aitkin, Hubbard, Becker and Pine. Lack of employment opportunity has been a contributing factor to population loss in many of these 10 counties. According to the state demographer, Minnesota's population grew by 107,910 people, while the top ten timber-producing counties lost a total of 12,210 people between 1985 and 1995.

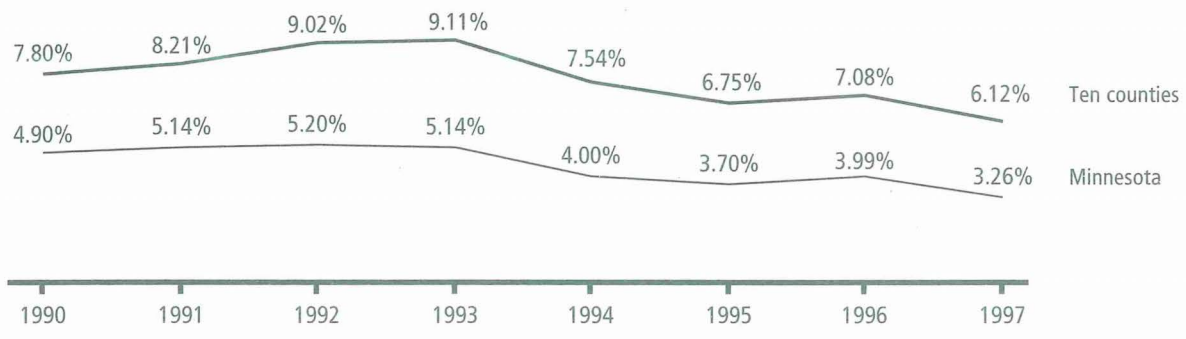
An economic stimulus is needed. Expanding the certified wood industry could create jobs, spur business growth and help reverse the outward flow of people.

Here are four suggestions for how the state might structure incentives to encourage development of a certified wood industry:

Sales tax: To balance the price of certified wood products with comparable noncertified goods in the market place, a sales tax exemption on certified wood products would reduce the price by 6.5 percent. This reduction would allow individuals and companies that incurred additional costs to pass those along if they did not exceed 6.5 percent. If the additional costs were greater than 6.5 percent, either the price of the certified product would be greater than the competing noncertified product or the additional costs would have to be absorbed somewhere along the supply chain.

Property tax: This approach would help producers in the early stages of their operations — which could be critical to their success — more than a sales tax

UNEMPLOYMENT RATES IN MINNESOTA'S TOP-10 TIMBER-PRODUCING COUNTIES HAVE BEEN CLOSE TO TWICE THE STATE'S AVERAGE THROUGHOUT THE 1990S



High unemployment rates in the timber-producing counties can also lead to population loss in these counties.
Source: Minnesota Department of Economic Security

exemption applied to a finished product. One possible approach: the county could forgive a set percentage of property taxes for landowners with certified forests. And, the state could reimburse the county through Local Government Assistance payments.

Timberland owners in Aitkin County pay $3 to $4 an acre in property taxes, according to county officials. Producing certified wood would cost from 55 cents to $1.94 per acre for all timberland acres. Under this scenario, each party would hypothetically share a proportionate amount of the costs according to their benefits. For example, if the additional costs of certified wood production were assumed to be $1.50 per acre and the business could gain 50 cents an acre back in increased sales, the county would reduce the property tax by $1 per acre. If it was then determined that the state and the county benefited equally from the growth of the certified wood industry, the state would reimburse the county for 50 cents per acre through government assistance payments.

Wisconsin has a successful program entitled the Managed Forest Law, which is conceptually similar to the hypothetical program above. In exchange for managing timberlands using a state-approved plan, landowners pay roughly 85 cents an acre in property taxes. This can save up to $30 an acre in some cases. For most landowners, the savings are more apt to be a few dollars an acre.

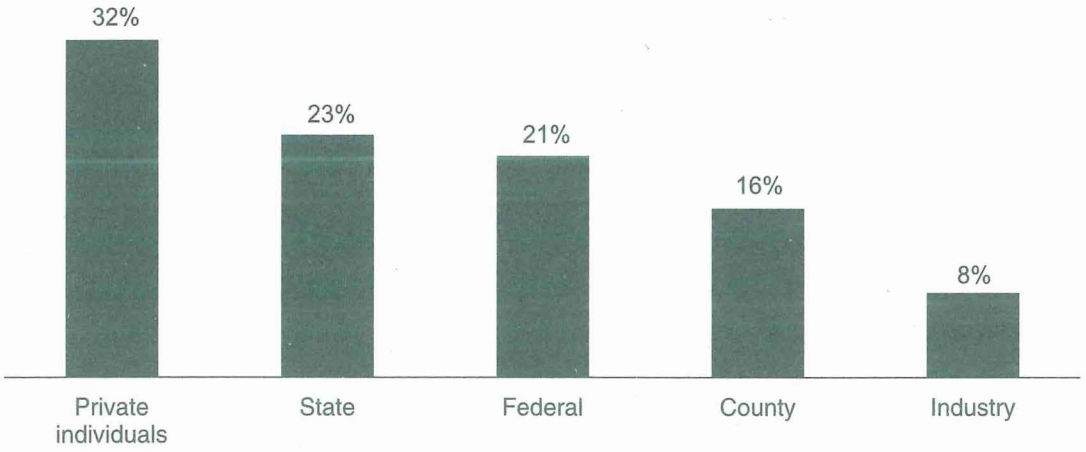
Educate consumers: Informing consumers about the benefits of purchasing certified products could increase demand and perhaps encourage consumers to pay a higher price for certified wood products. Greater local demand and having a price premium would give newcomers to the certified wood industry additional incentives and expand existing ones.

Actively work with suppliers to meet demand: Given that requests for certified wood currently go unfilled in Minnesota, the state could benefit by having a staff person who links requests for certified wood requests to suppliers.

Forestry has a big presence in Minnesota's economy

Minnesota's forests have a huge economic impact on this state. In 1995, the state's gross sales of forestry, lumber and wood products, furniture and fixtures, and paper and paper products exceeded $6 billion, according to the Department of Revenue.

MINNESOTA HAS A WIDE DISTRIBUTION OF FOREST OWNERSHIP



Broad distribution of ownership of the state's forestland is an indicator of the broad array of forest management styles.
Source: Minnesota Department of Natural Resources

Ranked as the third largest manufacturing industry in Minnesota based on employment, the forest industry generates 14 percent of all manufacturing dollars, according to the Department of Revenue. In 1996, wages in the Minnesota forest products industry amounted to more than $2.5 billion, according to the U.S. Department of Labor.

And, according to the Minnesota Office of Tourism, northeast Minnesota — where most of the state's forests are located — accounted for 18 percent of tourist visits in Minnesota's $8.7 billion dollar tourism industry.

Minnesota's forestlands are widely dispersed among many ownership groups. Federal, state and county governments own 60 percent. Private individuals own 32 percent and industry owns eight percent.

Of the 16.7 million acres of forestland, the Minnesota Department of Natural Resources estimates that 14.8 million acres are considered timberland and could be harvested. Currently, about 200,000 acres are harvested each year.

Despite federal and state regulations, Minnesota's forests are managed in various ways. Some owners use methods that result in short- and long-term environmental, economic and community costs. Other forests in Minnesota, however, have been certified based on some of the most stringent economic, environmental and community forest management guidelines in the world. The most notable example is the certified county and state forests in Aitkin County.

The Forest Stewardship Council leads the way

Certified forestry has developed as a response to practices that resulted in many avoidable economic, environmental and community costs. For example, unmanaged harvesting during inappropriate times of the year can fill water bodies with unacceptable levels of silt and chemicals. The concept of certifying forests and thus authenticating "green" forest products has been growing since the early 1990s.

The Forest Stewardship Council, a global umbrella certification organization, sets the principles and criteria for forest certification. Many certifiers throughout the world are accredited by the stewardship council, which is recognized as an impartial organization. Certifiers can alter the criteria in minor ways to adapt them to regional forest characteristics.

The 10 principles laid out by the stewardship council address the following issues: compliance with local laws, tenure and use rights and responsibilities, indigenous peoples' rights, community relations and worker's rights, benefits from the forests, environmental impact, management plan, monitoring and assessment, maintenance of natural forests and plantations.

As of the beginning of 1998, the Forest Stewardship Council estimated about 3.5 million acres of forestlands were certified in the United States and 24.7 million acres were certified globally.

Minnesota has 585,000 certified acres. Nearly 40 percent, or about 223,000 acres, is managed by the Aitkin County Land Department. The Minnesota Department of Natural Resources manages the other 362,000 acres. These 585,000 acres represent about 4 percent of the state's timberland.

To date, only county and state timberlands in Minnesota have become certified. Managers of most industrial lands follow the American Forest and Paper Association's Sustainable Forestry Initiative.

Based on conversations with forestry experts, this initiative is seen as an improvement over previous practices, but most experts say the industry's guidelines are not as stringent as the stewardship council's standards. However, because the global market for certified products expanded during the last year, some larger forestry businesses have begun to realize the benefits of third-party certification. As a result, some companies are exploring the use of the International Standards Organization 14001 registration and a third party audit process. But most U.S. businesses see no advantage to ISO 14001 registration because there is no label to let consumers know how the wood is harvested and processed.

Certification is catching on

Since certification of forestlands and production processes is so new, it is hard to determine its degree of success. However, most people familiar with the concept remain optimistic that it will continue to develop.

With 2.1 million acres, the State of Pennsylvania has the largest acreage of lands certified in the United States. In November 1997, Pennsylvania had 1.2 million acres certified. The remainder was certified a year later. So far, the economic effects of certification are unknown. However, given the commitment that Pennsylvania has made to certify its state lands and the interest expressed to date, officials there anticipate a potential for new investment and jobs and a clear benefit to Pennsylvania's environment and communities.

A commercial forestry company, Seven Islands Land Management Co. in Bangor, Maine has about 975,000 certified acres. These lands were certified in 1993 but this has not resulted in any new jobs, according to a company vice president. The company has yet to reap any other economic benefits; however, its public image has improved significantly. Moreover, the company, which traditionally supplied most of its wood to Canadian mills, is now building its own mill on-site to take advantage of the potential benefits of value-added processing. Unlike most involved in the certified wood industry, the Seven Islands Land Management Co. officials were not optimistic that certification would lead to new jobs and investment. While economic benefits have not been evident in Maine to date, certification has nonetheless resulted in environmental and social benefits.

Since 1992, the Menominee Tribal Enterprises in Wisconsin has managed one of the first certified forests in the United States. Although the Menominee have managed their forests the same way for the last 140 years, they were officially recognized for their sustainable practices in 1992. For the tribe, the benefits of certification have been less financial and more social. In recent years however, there has been consistent demand for certified wood from tribal lands. And, the Menominee Tribal Enterprises has been recognized globally as a model to follow.

Due to the increasing demand for certified wood products, the Department of Natural Resources wants to certify more than one million more state- and county-managed acres. That would be about 7 percent of the state's timberland in up to nine other Minnesota counties.

Besides public lands, the Department of Natural Resources and the Institute for Agriculture and Trade Policy have plans to help private nonindustrial forest owners certify their lands through a $150,000 Legislative Commission on Minnesota Resources project.

This project will certify foresters, who can then manage and certify small tracts of timberland. This will primarily benefit small private landowners who want to become certified but do not have the resources to do so.

In the fall of 1997, Aitkin County had about 223,000 acres, about 1.5 percent of Minnesota's timberland acreage, certified as a pilot project. To date, Aitkin County has received a great deal of publicity for being one of the first public land parcels in the country to be certified. In addition, certification has increased public confidence in the county's management of the forests, and there have been requests from around the world for their certified timber.

As of June 1999, three saw mills in Aitkin County had been certified for the chain-of-custody of certified wood. But Aitkin County still cannot fulfill all the requests for certified wood, according to the Minnesota Department of Natural Resources.

At the beginning of June 1999, Cass County had undergone the certification evaluation process and was awaiting its results. The county wants its land to be certified for two reasons. First, the county wants to be recognized as managing its forests in a sustainable fashion, and second, county officials expect this to be a sustained source of income for the county which will keep taxes as low as possible.

In 1997, estimated sales of county-owned timber amounted to a $1 million tax break for county taxpayers. Twenty percent went to the townships. Forty percent went to school districts, and the other 40 percent went into the county general fund. As a result, Cass County officials have decided that keeping their forests healthy makes good economic sense now and in the future.

Demand for certified products is on the rise, especially in Europe

Demand for certified wood products has been relatively low in the United States, but it has been high in Europe, especially the United Kingdom.

One strong impetus behind this demand has been a United Kingdom group known as the Worldwide Fund for Nature 1995 Plus. According to a Spring 1997 article in *The Amicus Journal*, this group represents a full 25 percent of the wood demand in the country.

This consortium consists of about 80 companies, most of which are committed to buying nothing but certified products by the year 2000, according to an article, "Certification in the Marketplace: A Global Review" in the May 1998 issue of *Western Forester*.

The first two companies to be certified in the United States were Colonial Craft, which is based in Roseville, Minnesota, and Collins Companies of Portland, Oregon, one of the world's largest suppliers of certified wood.

According to the vice president of marketing for The Collins Companies, the company had less than 500 employees just three years ago. Today, Collins employs more than 1,000 workers. The vice president attributed much of the increased employment to the growth of the certified forest product industry in the United States and abroad. Most of the company's new jobs involve the manufacturing of wood products.

Though certified wood products are in short supply in certain European countries, the current American market is spotty. Demand is strong in such cities as San Francisco and Austin, Texas, where citizens are well educated and have high incomes, and is likely to spread as awareness of the products grows, noted the Collins vice president. Minnesota is in a good position to develop industries relating to certified resources, he

added. The state is known for having a strong manufacturing sector. What's more, the Department of Natural Resources could consider certifying more land.

Colonial Craft has benefited enormously from producing certified wood products, according to the company's president, Eric Bloomquist. First, the company has received a great deal of publicity and recognition for being a pioneer in the U.S. certified wood product market. Second, Colonial Craft has generated new jobs and higher sales because of certified wood. Recently, the company built a new manufacturing facility in Alabama to meet increased demand resulting from a contract with a United Kingdom company. However, Bloomquist says that the low supply of certified wood still holds the industry back.

The Department of Natural Resources reported that Minnesota receives numerous requests for certified wood from around the world, but requests often go unfilled because such a small portion of Minnesota's timberland is certified. The result is many missed opportunities for expanding Minnesota's economy.

Given this demand, why are more certified operations not opened in Minnesota? There are a number of reasons, including:

- Since existing mills already work at full or near-full capacity, they have little incentive to search for additional business.
- Currently, most certified wood products are not sold at a premium, therefore the costs of certification to a mill owner or timberland owner are seen as reducing profitability.
- No state incentives exist to help interested parties become certified.
- Many companies considering certification are waiting to see if the market for certified wood is a fad or has long-term possibilities.
- Gaps exist in the supply chain. For example, there may not be enough sawmills or value-added manufacturing plants for the number of certified acres.

Consumers are unlikely to pay a premium

While most consumers indicate in surveys that they would pay more for "green" products, they do not act on their beliefs in the marketplace.

According to Mark Eisen of Home Depot, consumers' purchasing behavior is fixed more on "price-quality" relationships than on environmental considerations. The "greenness" of a product is only a factor when all other criteria are relatively equal. This could be an obstacle. As a 1996 article in *World Watch* notes, "If a price premium cannot be expected for sustainable production, noncertified competitors have an advantage over certified producers due to the extra costs associated with certification."

It is important to note that Home Depot once stocked some stores with certified wood. However, because the retailer could not purchase a large enough supply for all its stores, it stopped selling it. In August 1999, Home Depot announced that it will discontinue purchasing wood from sensitive areas, and by 2001 would place a priority on the purchase of certified wood products.

To increase American demand for certified wood products, the Certified Forest Products Council has been established in the United States. The Council is America's largest organization promoting the improvement of forest management practices through the purchase of certified wood products. The organization has more than 140 corporate members committed to using and selling certified wood products.

Examining the costs and benefits

This cost-benefit analysis examines the additional costs involved in certifying, managing, harvesting and producing certified wood products in comparison to the potential environmental, economic and social benefits. Exact cost and benefit figures could not be calculated because the certified wood industry and

certified forestry management are in their infancy, especially in Minnesota. Thus, most of the measures used in this study for social and environmental benefits are qualitative in nature.

This analysis attempts to incorporate as many of the factors as possible into a monetary analysis. The figures are only estimates and should therefore be used with caution. Unfortunately, a dollar value could not be put on some cost factors and most of the benefit factors. This type of analysis will be done with greater precision in the future as experience and knowledge of the certified wood industry increases.

The costs and benefits considered in this analysis are based on an extensive literature review of sustainable forestry and the production processes of certified wood products. The principal resource used is the Minnesota Forest Resources Council's *Economic Implications of Proposed Forest Management Guidelines for Minnesota.*

Forestry officials have stated that these voluntary guidelines are very similar to guidelines required for forestry certification. Therefore, the cost estimates to adopt these guidelines should approximate the costs involved in managing and harvesting a certified forest.

Costs of certification

To explain the cost of certification on a per acre basis and for comparison to the hypothetical property tax break, we assumed that all of Minnesota's 14.8 million harvestable acres would be certified and 200,000 acres per year harvested.

Certifying: Certification costs include the initial inspection, review of management plans and annual monitoring by an independent third party. Depending on the owner, size of the tract and location of the property, the initial certification costs could range from less than 50 cents per acre to several dollars an acre. This study assumes a high end estimate of $4 per acre. Annual audits could range from 5 cents to more than 20 cents per acre. It is assumed that the initial up-front certification costs would be spread over a five-year period. Annually then, these up-front costs for the first five years would range from 10 to 80 cents per acre. Adding the annualized up-front costs with the cost of annual audits, 5 to 20 cents per acre, yields an annual estimate range of 15 cents to $1 an acre on all lands, harvested or not.

Management and guideline implementation: Costs for administering and operating the forest management plan depend on the

MAJOR COSTS AND BENEFITS OF CERTIFIED WOOD INDUSTRY

Costs	Benefits
Certification	Business growth and jobs
Management and implementation of guidelines	Tourism
Harvesting	Increased value of older forests
Foregone revenues from uncut trees	Improved soil and water conditions
Reduced profitability assuming no premium for certified products	Improved biodiversity and habitat protection
Costs associated with chain-of-custody	Carbon storage
Increased cost of raw material for saw mills and value added business	Public relations and recognition
	Reduction in conflict over forest management
	Preservation of cultural and historical assets
	Intrinsic value

These factors were selected primarily from a list of potential costs and benefits identified in Minnesota Forest Resources Council's *Economic Implications of Proposed Forest Management Guidelines for Minnesota.*

Source: Minnesota Planning

owner's current forest management practices. Owners with comprehensive management plans and professional expertise are likely to incur minimal costs. Those who do not have plans or use professional forest managers are likely to incur a great cost to meet the guidelines. In general, nonindustrial private owners would incur the greatest expense because only about one-fifth of these owners currently use professional forest managers, according to the Minnesota Forest Resources Council. These private owners bring in about one-third of Minnesota's wood harvest each year.

Once management plans are written, putting the plan in place (for example replanting, stand cultural treatments and so forth) are likely to occur on harvested acres rather than on the entire tract of certified land. For this reason, the additional cost for incorporating timber harvest forestry management guidelines into timber sale activities is expected to range from $1 to $1.2 million for about 200,000 acres that are harvested each year, according to the Minnesota Forest Resources Council. This is assumed to be roughly equal to the cost of managing a certified forest. The council's estimate is based on a survey of forest managers' cost estimates for managing and planning, site preparation, regeneration and stand cultural treatments under the new guidelines. Thus, the annual estimate ranges from $5 to $6 for every harvested acre.

Harvesting: Estimating harvesting costs is difficult because the cost would vary considerably depending on the location, operation constraints, methodology used and forest type. However, one means of estimating additional costs associated with harvesting under the new guidelines is to look at the range of current harvesting operations. Based on a Minnesota Forest Resources Council survey of current Minnesota harvesting practices, the low- to high-cost differences ranged from $5 to $7 per cord.

The Minnesota Forest Resources Council estimates that the marginal difference when moving from not using the guidelines to full implementation of the guidelines could be as high as $3. Therefore, assuming that one-half of the extra cost is due to operational constraints, which is likely to happen if the guidelines were followed, then the high estimate is assumed to be $3.50 per cord with a low estimate of $2.50 per cord. Assuming a low-range harvest of ten and a high range of 18 cords per acre, the additional harvesting cost would range from $25 to $63 per acre for the 200,000 harvested acres.

For the purpose of estimating the per acre property tax break necessary to promote certification in Minnesota, the costs of certification must be spread to cover all certified lands (14.8 million acres) rather than limiting the costs to the land harvested annually (200,000 acres).

The cost estimates are: a range of 15 cents to $1 an acre for the initial and on-going certification process on all 14.8 million timberland acres; $5 to $6 per acre for the 200,000 harvested acres for management and guideline implementation; and an additional $25 to $63 per acre for harvesting the 200,000 acres.

The costs for management and guideline implementation and harvesting for the annual 200,000 acre cut amount to $6 million ($30 multiplied by 200,000) to $13.2 million ($66 multiplied by 200,000). When distributing these costs over the 14.8 million acres, they amount to a range of 40 to 94 cents per acre. Adding the per acre certification costs then yields an estimated range of $.55 to $1.94 per acre for the owner to certify all 14.8 million acres and harvest 200,000 annually.

Nonmonetary costs

Not all costs could be given a dollar value in this analysis, but these costs are nonetheless considered

important when analyzing the benefits and drawbacks of the certified wood industry.

Uncut trees: The foregone costs resulting from guidelines requiring greater percentages of trees left uncut could be considered as a cost if a short-term perspective is taken. However, if a long-term perspective is taken, this cost would be negated by the environmental, social and economic benefits of leaving a greater number of uncut trees.

The economic benefit to landowners is the increased value and quality of uncut trees for a future harvest. This simply exchanges short-term loss for long-run gain. For landowners who have a vested interest in the long-term prosperity of a particular forest, this benefit is easier to realize. Landowners and harvesters who are interested only in maximizing their per-acre harvest in the short term will consider this a cost and the guidelines a burden.

Chain-of-custody management: This has to do with how a company tracks its inventory up to the point of sale or transport. Depending on a company's size, the efficiency of an inventory control system and the number of kinds of wood handled, costs associated with chain-of-custody could be a factor. Typically, it costs on average $3,000 to be certified as a chain-of-custody company. However, in cases where a company does not already have an existing inventory control system, they would have to bear the additional expense of setting one up.

Reduced profitability due to increased raw material costs: For saw mills and value-added businesses, higher costs for raw materials must be taken into account because consumers have yet to show they will pay premium prices in the marketplace. Therefore, high raw materials costs would reduce profitability and deter participation in the certified wood market.

Benefits of certification

A wide range of benefits accompany the certification of forests. The industry is still in its early stages and dollar figures are difficult to assign. Because of this, the benefits discussed here are more qualitative than quantitative.

Business growth and jobs: Most national and state experts on sustainable forestry who were interviewed for this study predicted the market for certified wood products will continue to expand and create jobs. While a few experts disagreed, Collins Company and Colonial Craft have already done both. These two companies created new jobs. They did not simply transfer jobs from the noncertified to the certified-wood sector.

A recently certified wood product manufacturer in Aitkin County expressed his optimism about the certified wood industry and noted his plans to expand his business. Without the certification of lands in Aitkin County, this potential expansion would likely not have been considered.

A sizeable portion of saw timber is currently shipped out of state to be turned into wood products. Thus, job growth related to the certified wood industry may not necessarily result from more timber being harvested, but rather from keeping more Minnesota-grown timber in the state to be made into finished products close to home. This is because certified wood is supposed to be grown and manufactured locally. The idea is that the local economy should benefit from the local resource. This guideline could spur businesses to develop in counties that have certified forests.

Minnesota businesses that could be involved in the production of certified wood products are in an excellent position to get in on the ground floor of a young industry. Doing so would enable them to expand operations and create more jobs. This, in turn, would create a ripple effect in the economies of local

communities and the state because new jobs would also be generated in supporting sectors.

Tourism: Minnesota's recreation and tourism industries depend on the beauty of our forests. And, since having more certified forests would enhance the beauty of these areas, it is easy to conclude that certification would help tourism. Natural scenery is the number one reason vacationers visit these areas, according to a recent study by the Minnesota Office of Tourism.

The *Economic Implications of Proposed Forest Management Guidelines for Minnesota* also concluded that the certification guidelines would enhance Minnesota's forest resources for recreation and tourism.

Improvements in the visual quality of the forest and cleanliness of the surrounding water bodies enhances a forest's aesthetic value and therefore benefits tourism and recreation such as hiking, cross country skiing and bird watching. This, in turn, helps tourism-related businesses, such as shops, lodging facilities, guides and restaurants, as well as communities that depend on the success of those businesses for healthy economies.

Measuring these benefits is difficult. Given the facts that the rewards for managing a sustainable forest are likely to occur in the long-term and that they are difficult to positively correlate with a sustainable management style, there is no accurate means to estimate the tourism-related benefits at this time.

The tourism industry currently adds $8.7 billion a year to Minnesota's economy, according to the Office of Tourism. All told, the industry has 163,000 travel- and tourism-related jobs, which generate $3.5 billion in wages and salaries, and tax receipts of $800 million. Northeast Minnesota, where most Minnesota's forests are located, accounts for 18 percent of Minnesota tourism visits. With an $8.7 billion annual impact, it is easy to see the potential economic benefits of improving the visual quality of Minnesota forests and water bodies through the implementation of certification guidelines.

Fishing and hunting: In general, most experts believe that adopting the guidelines would improve fish and wildlife habitat, and thus the stability of their populations. But it is also possible that long-term changes in forest composition and habitat may harm some game birds and animals. However, with stricter guidelines for harvesting timber around water bodies, it is probable that lakes, rivers and streams would be cleaner and fish populations would increase.

Sustainable forests also should improve fishing conditions. Each year, about 2.3 million people fish Minnesota waters. They spend about $400 million on trip-related expenditures, according to the Department of Tourism. With improved fishing conditions, the fishing industry should benefit.

Increased value of older forests: Sustainable forestry practice calls for selective harvesting in hardwood cover types, that is, allowing some trees to remain while others are harvested. Depending on the time frame, management objective and site conditions, there could be clear economic benefits from a selective harvest because larger, high quality trees are more valuable. However, this benefit exists only if the owner has a long-term interest in a forest. In the short-term, selective cutting should be considered a cost.

Soil benefits: Certification guidelines affecting soil productivity and run-off are likely to have many benefits. Adopting the guidelines is likely to improve the productive capacity of forest soil, a key ingredient for a healthy and stable forest. In addition, using the guidelines would help reduce other problems that can arise in a forest. These include compaction, erosion, chemical soil concerns and flooding. Also, poor

management of forests and harvesting techniques can create sedimentary, water treatment and chemical problems in water bodies.

Biodiversity: In general, the health and value of the forests, characterized by greater biodiversity and more resilient biophysical systems, is projected to improve if the guidelines proposed by the Minnesota Forest Resources Council and others are adopted. Because many of these benefits are long-term and are not directly captured in marketable goods and services, it is beyond the scope of this analysis to place a value on them.

Carbon storage: If sustainable forestry practices are followed, the threat of global warming could be mitigated. This is because carbon storage in above-ground forest biomass and soil carbon would probably increase. Not knowing the full impact and complete relationship between the benefits of carbon storage and global warming prevents estimating the dollar value of this potential benefit.

Public relations and recognition: Certified forests have an undeniable public image benefit. To date, businesses and organizations associated with certification have received a great deal of positive recognition and publicity. Such recognition may increase sales and employment opportunities as noted in the economic section. But also, building good will in communities near Minnesota's forests is no small thing. Discussions with Aitkin County officials have noted this as one of the benefits stemming from the certification of county and state lands. In addition, there is likely to be less conflict among environmental groups and foresters on forest management.

Preservation of cultural and historical assets: The guidelines call for the preservation of cultural and historical assets. While the tourism industry may benefit from protecting these attractions, Minnesota's few remaining ties to the lifestyles and cultures of its past would also be better preserved. These are irreplaceable educational and community assets.

Intrinsic value: The guidelines would increase the intrinsic value of the forests as well.

After looking at all of the costs and benefits considered, it appears that the environmental, economic and community benefits of certification should outweigh the costs in the long run.

MAKING THE PROPERTY TAX WORK FOR SMART GROWTH

Making the property tax work for smart growth

The history of the property tax in Minnesota is one of constant change and increasing complexity. Although the tax has been modified, adjusted, altered and reworked in many ways over its 142-year history, reform has not been achieved.

Minnesota's property tax system:

- Penalizes property owners for improving their property
- Increases the costs of constructing and owning buildings
- Discourages redevelopment in urban areas and necessitates greater use of subsidies and public financing to support city renewal
- Is indecipherable to many Minnesotans largely because of the plethora of adjustments added to address equity concerns
- Favors home ownership, a worthwhile social goal, but forces other kinds of property owners to pay higher taxes and so negatively affects other social goals such as the availability and affordability of rental housing.

As the Minnesota Tax Study Commission noted in 1973, the design and structure of our property tax system does not support the long-term economic, environmental and social welfare of the state. In short, it does not support smart growth.

Why does the current property tax create these problems? Because of its structure, the property tax is actually two taxes — a tax on land values and a tax on building values. In Minnesota land and buildings are taxed at the same rate. But land and buildings have different economic characteristics:

- Land appreciates as cities grow but structures typically depreciate over time.
- The value of a piece of land is created in part by government investment (roads, schools, sewer systems), by general community growth, by the quality of surrounding properties, and by natural factors (such as being on a lake or near a wooded area.)
- The value of a building is created principally by private investment and market forces.
- The supply of land is fixed. Higher prices do not create more land and taxing does not reduce the supply. Taxing the value of buildings, on the other hand, discourages the construction and improvement of homes, businesses and apartments.

Taxes on land and buildings yield different results. Taxing building value increases the cost of its use. But because land cannot "move" or change in supply in response to higher taxes, the price of land decreases when taxed.

Tax experts give taxation of land values high marks for adhering to fundamental principles of sound tax policy (such as efficiency and equity) while it imposes minimum distortions and damage to the economy. This cannot be said for taxation of improvements.

> ***Local governments depend for financial survival upon a tax system which is not only detrimental to efficient allocation of resources and offensive to popular notions of equity, but also gradually destroys its base.***
>
> **— Minnesota Tax Study Commission, 1973**

While the Minnesota property tax does tax land values, most property tax revenue comes from the taxation of buildings. In 1997, approximately 70 percent of the property tax base in Minnesota was building value.

What's the best way to restructure Minnesota's property tax? This study concludes that site value taxation — an approach that decreases tax rates on building values and increases tax rates on land values — is an important element in Minnesota

property tax reform and an especially appropriate reform strategy for the smart growth of cities and urban growth areas.

From the standpoint of financing local government, site value taxation is both economically just and economically logical. Site value taxation recognizes that government investment in infrastructure and general community growth creates private wealth in the form of higher land values. This wealth is not earned by the property owners. As a result, a logical approach to financing government activity is to capture the increase in land value that comes from community factors and government investment and use it for public revenue. This approach would also offer a way for communities to pay for new city services while avoiding more harmful forms of taxation.

In considering the economic, social and environmental implications of the property tax, this study concludes that the economic signal created by site value taxation offers at least six potential advantages:

- It would help make all housing more affordable and support home ownership without penalizing other types of residential living.
- It would encourage a better use of land already serviced by public infrastructure.
- It would encourage urban redevelopment and potentially reduce the need for government subsidies and public financing of urban renewal projects.
- It would hold down the inflation of land values so all types of development are more affordable and less risky.
- It would reduce the need for cities to use heavy-handed land use policies to manage growth and reduce the financial motivation for cities to adopt exclusionary zoning practices.
- It would help financially support the preservation of open space and parkland.

Perhaps most significantly the rationale and logic behind shifts in tax burdens under a site value system would be linked to broader community interests and development outcomes a city may desire. Property class would not determine the shift in tax liability. As a modeling of site value taxation adoption in Hennepin County illustrates, a neglected and poorly maintained home may receive a tax increase while an attractive commercial building in a struggling inner-city area would receive a tax cut.

The potential disadvantages of site value taxation lie in implementation issues. One challenge is the ability to establish accurate assessments of land values on developed properties. Many experts, however, believe advances in information technology will eliminate this problem. A more fundamental concern is that under the present system there may be little incentive to establish accurate assessments of land values so land values may be underassessed. When land and buildings are taxed at the same rate, accurate total property value is the primary concern. To make site value taxation functionally and politically feasible, it may be necessary to improve the quality of land value assessments.

Land use and development incentives in site value taxation make it a valuable policy tool for cities and urban growth areas. For agricultural and rural areas, the economics of site value taxation may or may not be appropriate. As a result, some local flexibility in establishing tax rates for land and buildings should be permitted. Greater local discretion would allow local and regional governments to tailor taxation approaches to the unique land use and economic development conditions in their respective areas.

Improving the economic efficiency and local accountability of the property tax system are critical reform ideas for growing smart. However, eliminating economic distortions in the structure of the property tax through site value taxation is equally important. Moreover, many potential opportunities exist for local and regional governments to apply site value taxation, perhaps in conjunction with larger tax reform initiatives.

Though site value taxation would not resolve Minnesota's development concerns, it aligns economic signals with smart growth and the long term economic, social and environmental interests of the state. And it would provide local and regional governments with a reliable source of revenue with minimum side-effects to local economies.

Recommendations

- Create enabling legislation that allows local governments to adopt site value taxation, if they so desire, with differential tax rates for land and improvements.
- Increase the potential effectiveness of site value taxation by reducing the number of property classes, eliminating tiered rates and compressing class rates.
- Investigate the economic and administrative potential of a multidistrict site value taxation system to address metropolitan regional development concerns. Options might include replacing the county tax with a regional site value-based system or using a split-rate tax in each metropolitan county.
- Explore the designation of particular levies — such as school district levies for bonded debt, school referendum levies for operating expenses, or the general education levy — to be assessed under a site value taxation approach.
- Explore the potential for establishing site-value transportation taxing districts to pay the capital costs of new public infrastructure investments.

Background of Minnesota's property tax system

Despite its contentious history, the property tax remains a mainstay of local government. In 1999, Minnesotans are expected to pay about $4.6 billion in property taxes. This is about 20 percent of Minnesota's local and state revenues.

In its simplest form, a property tax system is based on how much money government needs after accounting for other revenue sources. This remaining amount of revenue needed is divided by the total assessed market value in the taxing jurisdiction to generate a property tax rate. Theoretically, every property owner would be charged the same rate. But Minnesota's system — like most property tax systems — bears little resemblance to this basic approach.

Minnesota's present-day system features a complex property classification system with different class rates for different property types. It also features a number of different exemptions, limitations and credits. Together, these features create large redistributions in property tax burdens — some property owners pay less while others pay more.

As a result, the property tax creates effective subsidies for certain types of property owners while distorting investment decision-making and creating trade-offs. For example, classification in the Minnesota property tax system favors homestead residential properties. While home ownership is a worthy social goal, classification forces other kinds of property owners to pay higher taxes. As a result, other social goals such as the availability and affordability of rental housing are negatively affected.

There are economic disincentives in the property tax system. Property owners are penalized for improving property since the tax increases the cost of constructing and owning buildings. There are also impacts on urban form and development. Nearly 30 years ago, the domino-like cause and effect relationships of the property tax were recognized by the Minnesota Tax Study Commission. The predicted results provided a glimpse into Minnesota's future, our present:

The taxation of improvements discourages intensive developments of sites and so contributes to urban sprawl. As the metropolitan complex spreads into the countryside, land prices are pushed up....

The very process which accelerates the encroachment of the metropolis into the countryside simultaneously causes the decay of the inner city. As structures depreciate, the tax on improvements penalizes their repair. Construction on new sites becomes more attractive than renovation...

Any machine which is not kept in repair incurs higher maintenance costs and more frequent breakdowns. A city which decays is analogous: the cost of providing basic services escalates and social problems multiply. As structural depreciation continues without renovation, the property tax base shrinks commensurately...

The economic costs of this policy are gigantic: the costs of the social problems exacerbated are beyond measure.

— Minnesota Tax Study Commission, 1973

Land and buildings should be taxed differently

What makes the property tax so potentially damaging to economic and social welfare? A fundamental problem has to do with how property is taxed. The property tax is actually two taxes: one on the value of the land and another on the value of the building. Together, the land value and building value make up a property's market value. Minnesota's system taxes these two parts at the same rate.

The problem arises because land and buildings have different economic characteristics:

- Land generally appreciates over time but structures depreciate over time.
- The value of a piece of land is created by natural forces (such as being on a hill or next to wooded area), by the community (roads, schools, sewer systems) and by the quality of surrounding properties. The value of a building is created by private investment and market forces.
- The supply of land is fixed. Higher prices do not create more land and taxing it does not reduce the supply. Taxing the value of buildings, on the other hand, discourages the construction and improvement of homes, businesses and apartments.

Taxing building value increases the cost of its use. Because of the unique economic qualities of land, taxing its value has a counterintuitive result. Since land cannot "move" or change in supply in response to higher taxes, the price of land *decreases* when taxed.

Policy experts give high marks to taxing land because doing so supports the fundamental principles of sound tax policy. It does not dampen economic activity. It does not shift burdens and distort other aspects of the economy. It encourages efficient allocation of resources. Taxing buildings does not stand up as well to principles of tax policy. It influences the incentive to build, how well the property is developed, and when the property is redeveloped. It dampens economic growth and distorts investment decisions.

Most property tax revenue in Minnesota comes from taxing the value of buildings. In 1997, for example, approximately 70 percent of the property market value in Minnesota was from the value of the buildings on the land, not the land itself.

The current property tax does not sufficiently recognize and account for the special characteristics of land. By failing to place greater property tax emphasis on land values, three problems result. These problems help explain the economic, environmental and development trends apparent today.

Decreasing marginal cost of land ownership is a problem: Under the current property tax structure, the additional cost of owning more land decreases as lot size increases. As a result, the property tax favors large lots and discourages efficient land use.

In Hennepin County, 95 percent of single-family residential homes have lot sizes between 4,000 and 23,000 square feet (which roughly translates into parcels between one-tenth and one-half of an acre). The first grouping of homes with lots between 4,000 and 5,600 square feet contains standard lot sizes found in Minneapolis and many first ring suburbs. The second grouping of homes with lots between 5,600 and 8,200 square feet contains the larger standard lot sizes found in many second ring Minneapolis suburbs. The increase in assessed value per square foot from the first to the second group can be expected given the higher property values typically found in these more affluent areas.

However, as residential lot sizes increase, mean assessed values per square foot show a downward progression. In effect, the marginal cost of land ownership decreases as lot size increases. For example, assuming that homes with average lot sizes pay the below average residential lot price of $4.84 for the first 6,840 square feet of residential property, the remaining 2,945 square feet in the average size parcel has an effective cost of ownership of only $0.82 per square foot (which translates into a 83 percent "discount.") enabling higher levels of land consumption.

Of course, people cannot make more land or purchase and move additional land to existing lots. As a result, there is an imperfection in land markets which allows the cost of the extra square footage on a lot to decline. The current property tax fails to correct for this. Taxing the land value portion of the property value more substantially than the building value would help correct this market imperfection and improve land use efficiency.

Land value inflation is a problem: Under the current property tax structure, land values appreciate at rates faster than wages and building values, thus reducing housing affordability.

A critical condition necessary for affordable housing is that the rate of increase in wages over time must match the rate of increase in the cost of the two basic elements of housing — land and buildings. Evidence suggests that for the past two decades, building costs have largely stayed in equilibrium with wages. The cost of land has not, and the Minnesota property tax structure allows land to appreciate at a faster rate.

Land is a unique factor in the cost of housing, and land value appreciation has long been identified as a significant but largely hidden issue in housing

RESIDENTIAL LOTS REFLECT DECREASING MARGINAL COST OF LAND OWNERSHIP

	Number of properties	Average lot value	Average lot size per square foot	Average assessed value per square foot
Smallest (4,000 – 5,599 sq. ft)	46,601	$21,908	5,113	$4.28
Below average (5,600 – 8,199 sq. ft.)	45,126	33,107	6,840	4.84
Average (8,200 – 10,799 sq. ft)	45,800	35,522	9,785	3.63
Above average (10,800 – 14,399 sq. ft)	43,283	41,544	12,304	3.38
Largest (14,400 – 22,999 sq. ft)	47,320	53,522	17,630	3.04

About 95 percent of Hennepin County single-family homes range in lot size from 4,000 to 23,000 square feet.
Source: Minnesota Planning and Clark Rieke

affordability. A 1978 report by the Task Force of Housing Costs of the U.S. Department of Housing and Urban Development noted that the developed lot as a percent of the cost of a single-family house had risen from 15 percent in 1960 to 20 percent in the late 1970s.

Data from Hennepin County shows that this trend has continued to the present. Information from the Hennepin County Assessor's Office shows that the developed lot for single-family residential homeowners now accounts for 28 percent of the cost of the house compared to only 23 percent in 1980. Importantly, this disproportionate land value appreciation is evident in both new lots and existing residences.

A 1996 report of the Builders Association of the Twin Cities found that land price escalation is a major issue for the continuing development and housing affordability of the Twin Cities metropolitan area. According to the report, "many of the developers stated that it would be nearly impossible to buy land at today's prices and develop a single-family home for $130,000 or less anywhere in the seven-county metro area."

Another perspective on land value appreciation is gained from information obtained from the City of Plymouth. Between 1984 and 1994 land prices experienced a higher rate of inflation than construction labor and materials for new housing, and appreciated at a rate nearly twice that of the consumer price index. By comparison, the median sales price of existing single family homes rose only 56.8 percent between 1984 and 1996.

Developed residential land also exhibits disproportional appreciation in value. Over an 18-year period in Hennepin County, lot values appreciated by nearly 150 percent. Meanwhile, building values appreciated by 90 percent, the consumer price index rose 95 percent, and Minnesota wages increased 117 percent. Higher land value appreciation rates were consistent through the period. In 14 of 17 years land values appreciated at a higher rate than building values, and in 12 of 17 years land values appreciated at a higher rate than the consumer price index.

Minnesota wage earners have lost ground in housing affordability primarily because of appreciating land values. If not for land value inflation, gains would have been made in housing affordability since 1980.

INFLATION RATES CLIMB FOR TWIN CITIES RESIDENTIAL LAND

Percentage change in price per acre since 1990

Chanhassen	1990-1993	46.7%
Woodbury	1993-1994	106.1
Savage	1994-1996	146.0

Note: The price per acre represents raw land.
Source: Builders Association of the Twin Cities

LAND INFLATES FASTER THAN ALL OTHER HOUSE-CONSTRUCTION COSTS

Percentage change between 1984 and 1994

Increase in mean sales price per square foot of a vacant single-family residential lot in Plymouth, Minnesota	96.9%
Median sales price of an existing home in Plymouth (1984-1996)	56.8
Framing lumber	77.4
Structural panel	66.7
Gypsum	0.1
Cement	15.0
Construction employment cost index (total compensation)	44.6
Consumer Price Index	48.8

Source: Minnesota Planning

Affordable housing is adversely affected by land value inflation rates which rise faster than building cost, wages, and general inflation rates. Two causes are:

- Value of new development features and site preparation costs incorporated into lot prices and land values
- Supply and demand dynamics

The incorporation of site preparation and development costs into the price of the land contributes to this inflation. A wide variety of development requirements imposed by land use regulations and building codes are incorporated into the lot price and capitalized into the value of the land. These include required features and special amenities such as protected wetlands, bikeways, wide roads and special street lighting, as well as "standard" elements such as water and sewer service.

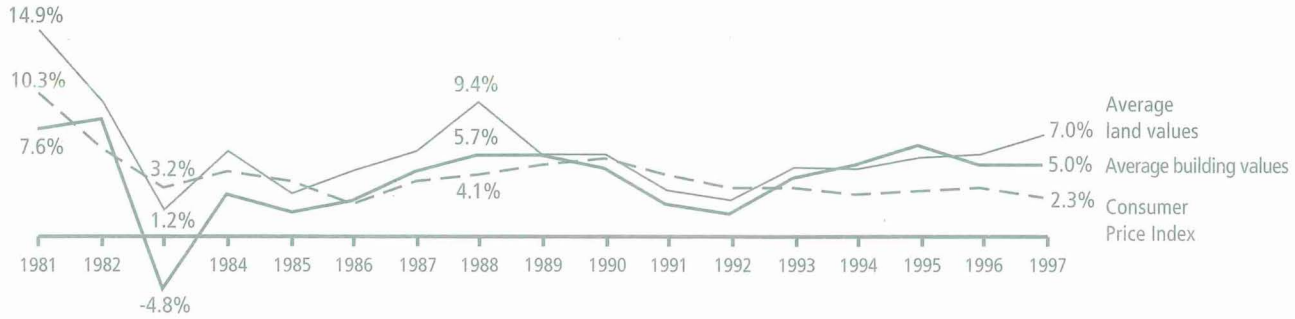
While this "forced appreciation" from government regulation and more stringent development codes undoubtedly explains some of the inflationary pressure, evidence suggests this is not the principal cause. From 1980 to 1997, the number of new single-family residential homes in Hennepin County increased from 228,620 to 256,704 parcels, or 12.2 percent. Although a sizeable increase, the sum of these new lot values is quite small relative to the combined residential lot values of the single-family homes which existed in Hennepin County before 1980. In other words, the vast majority of residential properties in Hennepin County are likely to have experienced little or no land value appreciation resulting from higher regulatory and development standards. Moreover, as described earlier, the trend in lot costs as a percentage of housing costs has risen for 30 years, predating many of today's more stringent and costly land use and development requirements.

The more potent and significant factors in land value inflation are simple supply and demand realities. Minnesota features:

- Heightened demand for land, fed by a growing population, the attractiveness of large lot lifestyles subsidized by home mortgage interest deductions, and a decreasing marginal cost of land ownership.
- Artificially constrained supply due to a wide variety of government actions and regulations. Two types of governmental actions, which are especially influential, are zoning ordinances and urban growth management strategies. Ordinances, such as minimum lot size requirements, parkland and open space set-asides, and building size requirements, further reduce the effective

LAND VALUE APPRECIATION OUTPACES WAGES, BUILDING VALUES AND CONSUMER PRICE INDEX

Annual rates of appreciation, single-family residential lots, Hennepin County



Between 1980 and 1997, single-family homes became less affordable because land values appreciated at a rate (149%) much faster than building values (90%), and growth in the Consumer Price Index (94%) and Minnesota wages (117%).

Sources: Minnesota Planning and Clark Rieke

supply of land. Similarly a local form of growth management, the Metropolitan Urban Service Area, influences the effective supply of housing land by prescribing the location of land available for municipal water and sewer services.

The current Minnesota property tax system enables disproportional land value inflation in two ways. First, it fails to tax land at a rate which would dampen the inflationary effects. Taxing land values reduces the price of land. Although part of the Minnesota property tax revenue is based on land values, the beneficial impact is muted since land value typically makes up a smaller portion of total market value and the tax rate is equal to that on improvements. For example, in Hennepin county only 28 percent of the total property tax base is land value.

Second, as described below, the property tax lowers the "effective land supply" by enabling properties within a developed area to remain undeveloped or underutilized in relation to their value.

Low land holding costs are a problem: Under the current property tax structure, economic incentives exist for withholding land from development or keeping urban land underdeveloped in relation to its value.

The Minnesota property tax system has subtle but important influences on the nature and timing of property development and redevelopment.

If the land value of a parcel is high and the economic return on the property in its current condition is insufficient to pay the tax, the property tax liability creates an economic signal that development or redevelopment to better use is appropriate. Examples of this type of property turnover can readily be found along new transit corridors and next to major development projects where land values appreciate rapidly. In these areas, properties are sold and new office and commercial buildings are built because these types of development can afford the increased land values.

The problem with the existing system is that the turnover is often slower than economic efficiency would dictate. The reason is that the property tax often creates a low holding cost for land. That is, an owner can keep a property underdeveloped in relation to its value because the capital gains from land value appreciation exceed the cost of holding onto the parcel. The owner benefits, but the city pays the opportunity cost — the lack of redevelopment and the reduction in effective supply of land.

An example of this can be seen in the impact on a commercial-industrial parcel located near the Mall of America in Bloomington. Information obtained from the City of Bloomington Assessor's Office demonstrates the redevelopment disincentive in the system.

In 1966, a company constructed a one-story industrial building on land assessed at $0.38 per square foot. At that time, the development intensity of this parcel was a very respectable 77.7 percent as measured by the assessed value of the building divided by the total assessed value of the property. In other words, it was a very appropriate location for a manufacturer of this size to be, given underlying land values.

Over the next three decades substantial changes in the area have caused land values to appreciate rapidly. New interstate construction, continued airport development, and finally the Mall of America, were three major factors leading to land values appreciating by nearly 1,600 percent in 33 years. (Land values were adjusted for the 1972 statutory change in assessment practice.) This translates into a compounded rate of 8.6 percent per year. By comparison, the consumer price index rose

517 percent during this period or at a compounded rate of only 5.1 percent per year — providing some evidence that land values for commercial and industrial properties, like residential, are also out of equilibrium with inflation rates. During this period, the company building reinvestment was negligible or zero as evidenced by rapidly declining assessed values for the building. Today, it is an undistinguished structure, parts of which are highly depreciated and a worthy target for redevelopment. Land values have made the current use of this property obsolete.

However, the existing property tax fails to help this process of redevelopment along. Rather it enables the property to remain in its underdeveloped state since the capital gains from land value appreciation easily exceed the additional property tax burden resulting from land value appreciation. Over the last several years the company has had an estimated average capital gain of $37,000 annually from land value appreciation. Meanwhile the total property tax payable in 1999 was only $28,230. The estimated capital gains on the parcel more than offset the property tax burden. The failure to tax the appreciating land values more substantially enables this valuable property to remain in an underdeveloped state indefinitely. It is worth noting that commercial-industrial land can still be purchased for $1.30 to $2.40 per square foot in other areas of Bloomington.

This same economic signal occurs with raw or unimproved land, as demonstrated by another parcel located in the same area of Bloomington. In 1972, a company completed a large office building on 70 acres it had purchased in the 1960s. A significant amount of acreage has remained undeveloped in the 27 years since this construction and features large open air parking areas, lawn, and ballfields. In 1972, the land was assessed at $0.90 per square foot. By 1999 it had risen to $8 per square foot.

In this instance, land values have appreciated by nearly 888 percent over 27 years, which translates into a compounded rate of growth of 8.4 percent annually. Total property taxes paid in 1999 were $1.4 million of which $720,000 were based on land value. However, the average annual estimated capital gain in land in recent years was $1.25 million, or nearly twice the property taxes payable for the land. In this instance, some of the capital gain was realized as 18.3 acres were sold in 1999 to another party for $9.86 per square foot — a 23 percent premium over assessed value.

By failing to tax land values more substantially, "above average" capital gains (gains in excess of appreciation in value suggested by rates of inflation) will continually accrue to property owners. Unlike income generated from property use and investment activity, these gains are not earned in total by property owners. As a result, properties can remain underdeveloped in relation to land value and new development is pushed further outward.

Site value taxation as a sustainable development approach to reform

Higher land taxes, especially when accompanied by reduced taxes on structures, look like an idea businessmen ought to embrace and promote. The benefits in the form of jobs and increasingly compact development are not only lasting but flow to the whole community.

— "Higher Taxes that Promote Development"
Fortune, August 8, 1983

Land values and taxation of land values unify such seemingly diverse topics as sprawl, affordable housing, and urban redevelopment. With regard to the property tax, the damage done by overtaxing building values is equaled by the damage done by undertaxing land values. Refocusing more of the property tax burden on

land value can help the property tax work for, rather than against, economically and environmentally sound development.

Site value taxation (or the "split-rate" property tax) offers an approach to property tax reform tailored to Minnesota's economic, social and environmental interests. Site value taxation "splits" the property tax into its two components, a tax on land value and a tax on building value. Land values are "uptaxed" at a differential rate greater than the buildings and improvements which are "downtaxed." Differential rates would be phased in over an extended period of time to allow real estate markets and property owners to adjust to the change.

The concept of site value taxation is held in high regard by many different organizations and individuals. Eight Nobel Laureates in economics have endorsed site value taxation. It has been praised by both the Sierra Club and *Fortune* magazine. As interest in tax policies which provide market incentives to address social problems grows, the concept of site value taxation is receiving greater attention in public policy circles.

The potential benefits of site value taxation are numerous. The advantages can be summarized from different perspectives:

- Tax policy perspective: Tax economists generally praise site value taxation for its ability achieve economic efficiency and equity together and impose minimal distortions to the economy. Using a tax base that has fixed supply (land) is the best way of assuring against economic distortions, inefficiency and losses to the economy.
- Development perspective: Site value taxation reduces the property tax penalty for improving property. It dampens land value inflation thereby reducing development risk and making all types of development more affordable. By raising the holding cost of land and reducing the cost of redevelopment, it encourages infill development and redevelopment of underutilized properties. Investment is channeled into productive capital expansion rather than unproductive speculative activity in land holding.
- Environmental perspective: Centrifugal pressures for urban sprawl are reduced by encouraging best use of higher value (already serviced) land. It makes urban high-value land parcels more economically competitive with the outlying areas. It encourages more efficient land use and improves the economic viability of mass transportation.
- Governmental perspective: From the standpoint of financing local government, site value taxation is both economically just and economically logical. Site value taxation recognizes that government investment in infrastructure and general community growth creates private wealth in the form of higher land values — wealth not earned by the property owners. As a result, a logical approach to financing government activity is to capture the increase in land value that comes from community factors and government investment and use it for public revenue. Since land values grow reliably as a city grows, it would also offer a way for communities to pay for new city services while avoiding more harmful forms of taxation.

The actual development benefits realized, however, will vary because the property tax is only one of many factors influencing property development in a region. Site value taxation sends the right signals, but the incentives will vary relative to other factors such as land use regulations, existing subsidies and incentives, and general market conditions.

Certain countries, most notably Australia, New Zealand, Taiwan, Denmark and South Africa, have established histories with this approach to taxation. In the United States, site value taxation has been adopted by 17 cities in Pennsylvania, including Pittsburgh and Harrisburg, the state capital.

How site value taxation works: By uptaxing land values and downtaxing improvement values, the split rate property tax favors greater land use efficiency and development intensity per dollar of land value. At the individual parcel level, change in tax burden would be determined by two simple factors:

- The ratio of building value to total property value for the site
- How this ratio compares to the average in the county (or city, or whatever taxing jurisdiction is adopting the site value system).

Building value plus land value equals total property value. The building-to-total-value ratio is a measure of the intensity of building investment per dollar of land. For example, if a piece of property has a total assessed value of $100,000 of which $70,000 is building value, the building-to-total-value ratio is 70 percent.

This same calculation can be done for the sum total of all properties in a taxing jurisdiction to arrive at a jurisdiction-wide average. To determine whether the property tax bill would be lower or higher under a split rate system, the ratio of the parcel is compared to that of the jurisdiction average. Properties having higher ratios, reflecting better-than-average property development relative to land value, would receive a tax cut. Properties having ratios lower than the jurisdiction average would receive a tax increase.

For example, assume there is a piece of property in a county that has a total assessed value of $100,000 — $70,000 of building value and $30,000 of land value. Also assume the property is taxed at 1.5 percent. The property tax bill for this property is calculated as follows:

Land valued at $30,000	x 1.5% tax rate	=	$ 450
Building valued at $70,000	x 1.5% tax rate	=	$1,050
Total property tax			$1,500

Now assume the county decides to implement a site value system. The county wants to tax land at twice the rate of buildings but wants to collect the same amount of total tax revenue as it did before. Assume the countywide building-to-total-value ratio is also 70 percent. A simple algebraic calculation determines that the tax rate needs to be 2.308 percent on land and 1.154 percent on buildings in order to be revenue neutral (no increase or decrease in total property tax revenue collected by the county). The new property tax bill for the piece of property described above would be calculated as follows:

Land valued at $30,000	x 2.308% tax rate	=	$ 692
Building valued at $70,000	x 1.154% tax rate	=	$ 808
Total property tax			$1,500

Because the building-to-total-value ratio for the property matches the countywide average ratio, there is no change in tax liability.

Now assume a different piece of property with a total property value of $100,000. However, in this case, the building value makes up a smaller percentage of total property value. The building-to-total-value ratio for this property is only 60 percent, below the countywide average. The property tax bill under a site value system would be calculated as follows:

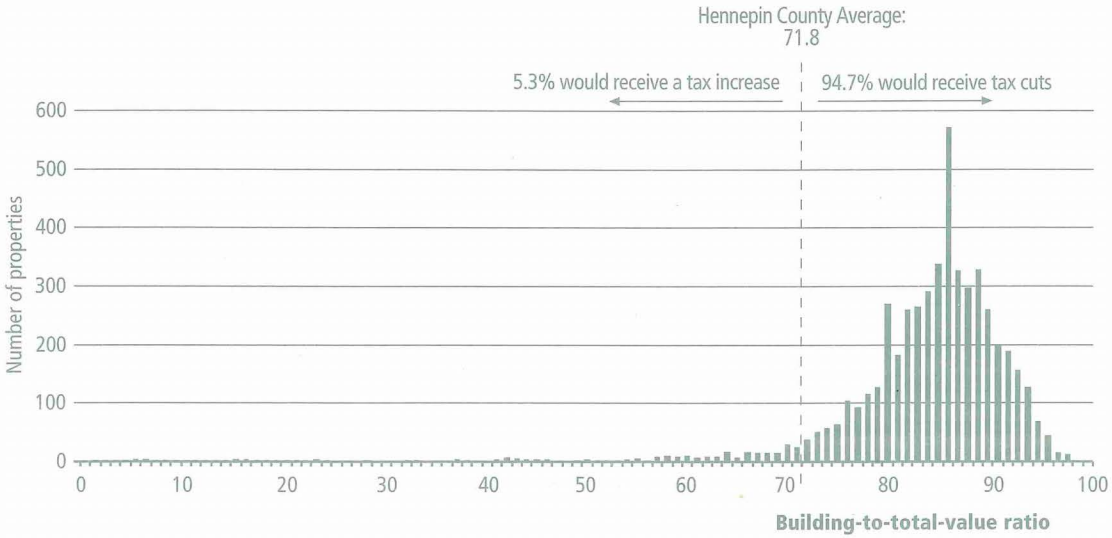
Land valued at $40,000	x 2.308% tax rate	=	$ 923
Building valued at $60,000	x 1.154% tax rate	=	$ 692
Total property tax			$1,615

Note that under the current system which taxes land and buildings at the same rate, this property would have a tax bill of $1,500. Thus, adopting site value caused this property's tax bill to increase by $115.

A final scenario involves a property in which the building value makes up a larger percentage of the total property value than the county average. Assuming

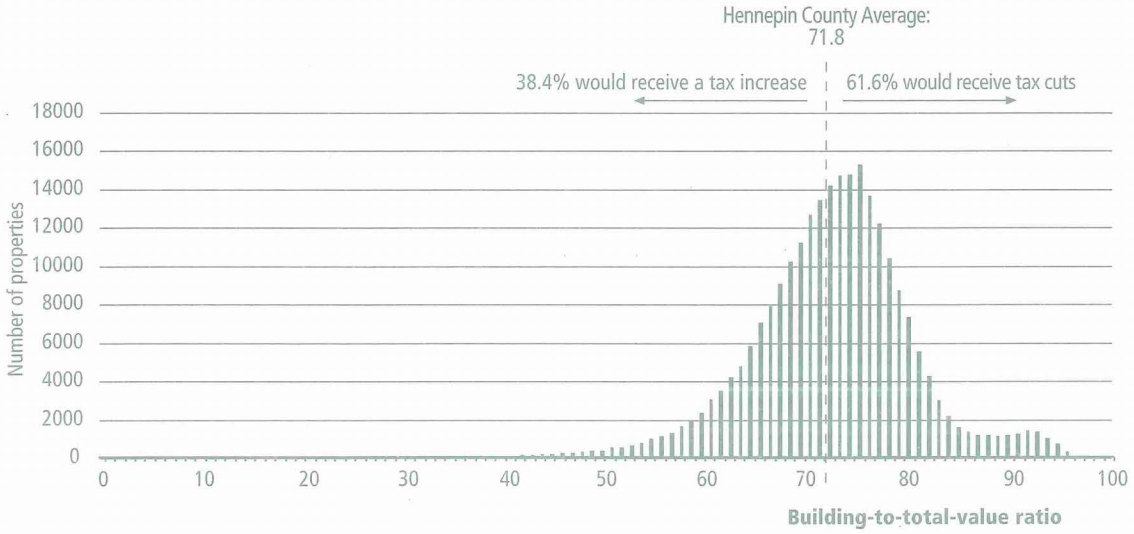
A HENNEPIN COUNTY EXAMPLE OF TAX DISTRIBUTION UNDER A SITE VALUE SYSTEM

Apartment properties



Under a split-rate system, about 95 percent of Hennepin County apartment properties would receive some level of a tax cut. While most apartment properties are valued at a rate higher than the average building-to-total-value ratio, some undermaintained and highly depreciated apartment properties fall below the average. The additional property tax burden might encourage the sale of depreciated properties for redevelopment and help improve apartment housing stock.

Single-family homes

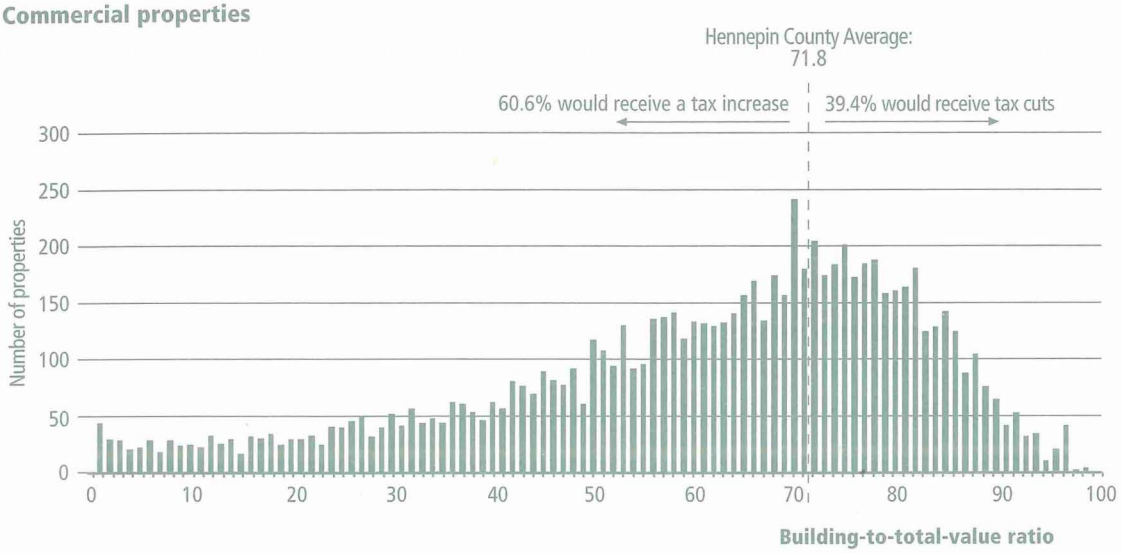


Residential homesteads show a remarkably normal distribution around the county average. Under a split-rate system, 61.6 percent of single-family residential homesteads would receive some tax cut. However, because homesteads concentrate around the mean, significant increases or decreases in property tax bills would be rare. Most increases or decreases would be very small and often unnoticeable to most homeowners.

Note: This analysis assumes no classification.

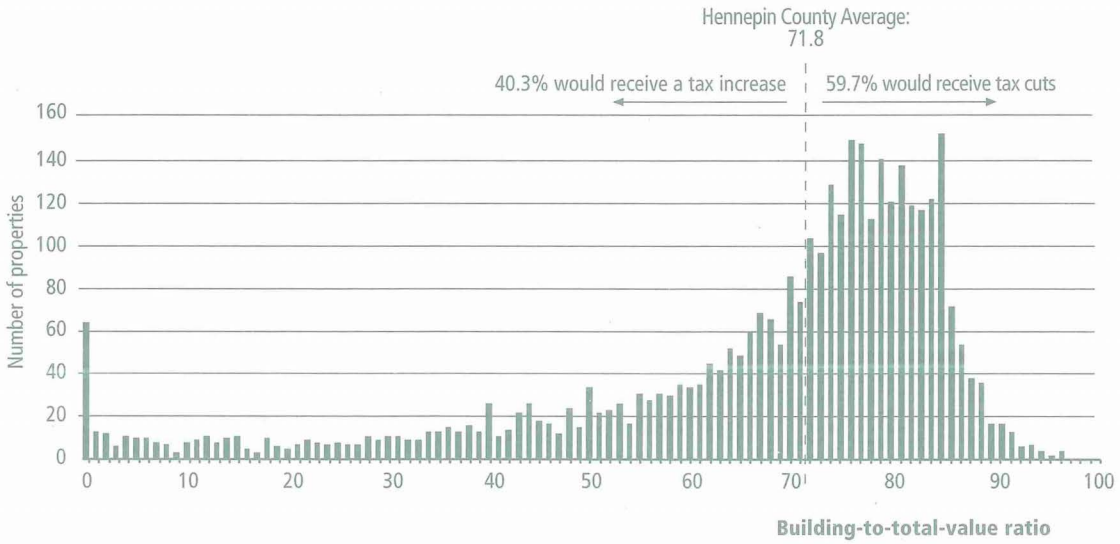
Source: Minnesota Planning

Commercial properties



Commercial properties show the greatest spread in building-to-total-value ratios of any major property types. The majority of commercial properties, 60.6 percent, would receive some level of tax increase under a split-rate system. Since land use inefficiency (low capital improvement per dollar of land value) is penalized under a split-rate system, retail properties featuring large open-air parking lots would frequently receive a tax increase.

Industrial properties



Unlike their commercial counterparts, industrial properties are highly concentrated around the county average, and the majority (59.7 percent) would receive a tax cut under the split-rate system. However many industrial properties fall in low building-to-total-value regions suggesting that there are industrial properties with extra land that would receive a significant tax increase.

Note: This analysis assumes no classification.

Source: Minnesota Planning

a $100,000 property with a building value of 80,000 and land value of 20,000, the property tax would be as follows:

Land valued at $20,000	x 2.308% tax rate	=	$ 462
Building valued at $80,000	x 1.154% tax rate	=	$ 923
Total property tax			$1,385

This property would receive a property tax decrease of $115 in comparison to the tax under the current system.

Tax redistribution under a site value system: What might the nature of tax shifting under a split rate system in Minnesota look like? Information was obtained from the Hennepin County Assessor's Office allowing building-to-total-value ratios to be calculated for different types of property in the county. In addition, a statistical summary of land use was created to obtain a better understanding of degree of shift which would occur within a class. Together they provide a better understanding of the potential redistribution of taxes under a site value system.

It is important to note that the following general analysis assumes a base case of all properties being taxed equally — no classification — and a tax system with one rate for both land and improvement values. Actual tax shifts would be based on the effective tax rate for these properties after accounting for all exemptions, deductions, and credits. In a sense, the multitude of classes, tiers, and the plethora of special provisions and adjustments makes every parcel's levy in Minnesota essentially unique. As a result the concept of a "baseline comparison" to evaluate actual tax redistribution for a county the size of Hennepin was not possible, given the resources for this study.

The histograms describe the frequency of parcel distribution based on building-to-total-value ratios for four major property classes in Hennepin County. The Hennepin County building-to-total-value ratio is 71.8. If Hennepin county property taxes were collected using a split rate system, every parcel with a ratio less than 71.8 in the county would receive a tax increase while every property above the county average would receive a tax cut.

Under a split-rate system, property class does not determine the shift in tax liability. As the histograms show, "winners" and "losers" can be found within each class of property. A poorly maintained home may receive a tax increase while an attractive five-story office building featuring underground parking may receive a substantial tax cut. Under a split-rate system, the logic behind the tax shift is now linked to desirable development outcomes such as better use of existing city infrastructure and greater levels of building improvements relative to land value which a city or county may want to encourage.

Calculating building-to-total-value ratios for property subtypes illustrates how specific types of residential, commercial, and industrial property would fare, on average, under a split rate system. Again, the building and land value relationship in each parcel would determine actual changes in tax liability. Even in below-average property subtypes, a few parcels would end up with lower taxes. Likewise, in above-average property subtypes some parcels would end up with higher taxes. It is also important to note that a split-rate system needs to be implemented over an extended period of time to allow real estate markets and property owners to adjust to the system. Most site value experts recommend a 10- to 15- year phase-in of differential rates.

A review of the commercial-industrial property subtypes shows that retail stores and complexes — largely as a result of one story development and extensive parking lots — would bear a significant share of new tax liability. However, many economists would argue that placing a greater burden on these properties holds economic logic since their low ratios represent economic inefficiency, significant opportunity

costs to the city, and wasted community value. Land use inefficiency is analogous to the economics of a factory with empty building spaces and unused production capacity.

In the past, classification in the Minnesota property tax system has addressed this issue, although in an exceptionally distortive and inefficient way. The need for classification is reduced or eliminated by the implementation of a site value system.

Implementing site value taxation

As with any tax policy, the feasibility of site value tax adoption is influenced by many issues.

Administrative issues: Property assessment and valuation is the cornerstone of the property tax. If site value taxation creates more administrative problems for assessment professionals in a context which is already charged with high potential for legal appeal, implementation is unlikely.

The ability to identify site value and improvement value separately for each parcel in a taxing jurisdiction is the cornerstone for site-value implementation. Although methodologies exist and assessors do this routinely, this is not a trivial matter. Many experts, however, believe advances in information technology, such as geographic information systems, allow the

A SITE VALUE TAX SYSTEM WOULD REDUCE TAX ON PROPERTIES ABOVE THE AVERAGE COUNTY BUILDING-TO-TOTAL-VALUE RATIO

Hennepin County with a 71.8% current average building-to-total-value ratio

Property types below county average	Average building-to-total-value ratio	Property types above county average	Average building-to-total-value ratio
Mobile home parks	11.8%	Nursing homes	89.9%
Automobile showrooms	33.7	Cooperative housing	88.8
Seasonal residential recreational	34.3	Hospitals	87.7
Service stations/ fuel only	38.9	Apartments	86.8
Department stores	41.8	Apartment condominiums	86.4
Convenience stores	45.3	Condominiums	85.1
Residential lakeshore	48.2	Low-income housing	83.2
Service stations with garage	50.1	Townhomes	80.6
Community shopping center	51.2	Triplexes	77.5
Neighborhood strip malls	53.5	Light manufacturing	76.9
Fast food restaurants	54.7	Industrial engineering	76.2
Other restaurants	56.8	Hotels	72.8
Supermarkets	57.3	Premium office buildings	72.3
Banks	59.6	Fitness centers	71.8
Bars and taverns	61.9		
Cinema theaters	64.5		
Motels	64.6		
Retail stores	65.6		
Office buildings	67.0		
Parking structures	67.7		
Industrial manufacturing	68.8		

Note: The building-to-total-value ratio is the assessed value of the building divided by the assessed value of the entire property (building and land). The average building-to-total-value ratios indicate how each property type would fare on average under a site value tax system. These ratios will vary from property to property. Within a property type, such as nursing homes, some properties would receive a tax increase and others a decrease depending on the property's ratio. This chart excludes single-family residential and nonlakeshore properties.

Source: Minnesota Planning

value of land components to be better recognized individually and in the aggregate making site value taxation more administratively feasible.

A more fundamental concern is that currently there is little incentive to establish accurate assessments of land values. Under the present system, which taxes land value and building value at the same rate, accurate total property value is the primary concern. In some areas, current land values may be underassessed. This could complicate and compromise site value implementation.

The change required is to ensure that land value assessments are done as diligently and as accurately as the assessment of total value. Methodologies exist; the keys to enabling this are political will and administrative support.

Land use regulation and zoning issues: Given that land use regulation and zoning are a permanent fixture in development today, a pragmatic way to examine site value taxation is to explore what it can offer by introducing market-oriented incentives and efficiency into this system. In this context, the ability to capture a greater share of land value appreciation in property for public purposes offers two important contributions to land use planning and zoning strategies.

- Site value taxation, through value recapture, reduces the incentives for cities to adopt exclusionary zoning practices

"Exclusionary" or "fiscal" zoning occurs when local governments implement zoning ordinances to make sure government revenue rises as fast as or faster than the demand for local services. Ordinances such as minimum lot sizes and mandatory three-car garages ensure low-density development, which keeps the demand for government services in check. At the same time, the cost of these features are such that only high-income households can afford them.

Site value taxation offers a way to reduce the dependency on fiscal zoning by allowing cities to capture more land value appreciation as a public revenue source, a source which grows consistently and reliably as a city grows. One study which simulated a split rate system in Vancouver, Washington found that a phased-in 3-to-1 tax rate differential between land and buildings would result in a 40 percent recapture of "windfall" gains (gains in excess of inflation) from land value appreciation whereas the conventional property tax would only capture 22 percent.

The potential impacts are multiplied on a regional or citywide basis and continue with subsequent investments in public infrastructure. For example, in a 1997 study, land value appreciation was calculated for an area comprising two miles either side along a nine-mile stretch of new interstate highway near Albany, New York. The study concluded that in 1995 dollars, the total capital cost (construction and right of way) was $129 million. Land values for the 30,516 acres comprising the study area increased by 736 percent over 30 years or by $3.6 billion (1995) dollars.

During the initial growth spurt, as cities invest in public infrastructure, land values appreciate rapidly. Site value taxation can provide a solid revenue base for anticipated growth in demand for city services. Recapture can continue when cities must replace or invest in new infrastructure allowing a city to forego other, more economically harmful, tax increases.

- Site value taxation can help support the preservation of open space and agricultural lands.

Site value taxation, with its emphasis on using land more efficiently, may cause concerns about overdevelopment and the elimination of open spaces around urban edges and within center cities. Although these areas potentially would be taxed more heavily under a site value system, the ability of a city to retain these areas via zoning can be enhanced under site

value taxation. Open space adds to the value of neighboring property. This enhanced value can make up for, or even surpass, whatever loss of revenue these sites may have provided.

An example of this recently unfolded in New York City. Mayor Giuliani proposed that the publicly owned vacant parcels used by neighborhoods as community gardens be sold and developed as private properties added to the tax roll. The neighborhoods resisted and won the right to retain the gardens by proving that the vacant parcels more than contributed to the added tax base of the city by increasing the value of neighboring properties.

An additional attractiveness of site value taxation is that the price of open-space preservation is paid by the people directly benefiting from the preservation activity. Site value taxation simply ensures that there is a greater level of fiscal accountability in such land protection efforts and that the cost to the community is paid by properties whose market value increases as result of protection efforts.

Site value taxation also supports public access to open space and recreational resources. Without public access, high land values are typically concentrated among properties immediately adjacent to the resource. Under a site value system, these property owners would pay more in property taxes. The way to reduce this tax burden is to provide ample public access, which would enable more properties to share the benefit and burden.

Smart signals and long-term benefits

The property tax is not the sole solution for curing Minnesota's development ills. But it is also not just a revenue source for local government. Intelligent design and structure of the Minnesota property tax system can provide cities and local government with a reliable and sound source of revenue while encouraging smart development activity and patterns which meet economic, social and environmental needs. This type of property tax structure involves a greater tax emphasis on land values and a reduced tax emphasis on building values.

The land use and development incentives in site value taxation make it a valuable policy tool for cities and urban growth areas. For agricultural and rural areas, the economics of site value taxation may or may not be appropriate. As a result, local flexibility in establishing taxation rates for land and buildings should be permitted. While there is a definite state interest in ensuring a level of consistency in property taxation throughout the state, local discretion in establishing tax rates for land and buildings would allow local and regional governments to tailor taxation approaches to the unique land use and economic development conditions in their respective areas.

Site value taxation lacks the high-profile, quick-fix appeal that many new government programs have. But like a health maintenance program, site value property tax reform can be expected to achieve reliable and steady returns year after year to Minnesota citizens — if without high visibility. It will also help those government programs designed to improve the quality of life for Minnesotans work more productively and efficiently.

SENDING CLEAR SIGNALS FOR AIR POLLUTION CONTROL

SENDING CLEAR SIGNALS
FOR AIR POLLUTION CONTROL

Sending clear signals for air pollution control

In 1991, under the direction of the 1990 Federal Clean Air Act, the Minnesota Legislature established laws creating the current air emission fee program. The objectives were to create a fee program that would satisfy federal Clean Air Act requirements and cover the administrative costs of running the air program.

Smart Signals suggests that instead of using fees to just cover administrative costs, the Minnesota Legislature should broaden the objectives of the program to encourage emissions reduction and environmental protection. Broadening the focus of the current system through clear and consistent economic signals would likely lead to greater economic, environmental and social benefits to the state.

While the current fee system meets the criteria of both the 1990 Federal Clean Air Act and the 1991 legislation that established the program, its structure prevents it from being an effective tool for encouraging pollution reduction:

- Small polluters are put at a disadvantage over big polluters, because of a 4,000 ton cap when determining the per ton fee.
- Businesses and other entities that pay pollution emission fees can reduce their pollution but still pay higher fees.
- Pollution fees do not take into account the level of toxicity for various pollutants or where the pollution occurs. Polluting in a more densely populated area, for example, may be more harmful than polluting in a less populous area.
- Air pollution emission fees are charged for only five air pollutants. Known as "criteria pollutants," they are sulfur dioxide, nitrogen oxide, volatile organic compounds, lead and particulate matter less than 10 microns in diameter. Within the last several years, however, there has been debate on including "air toxics," a group of 188 additional hazardous air pollutants.
- Many polluters do not pay any fees. Nearly 90 percent of the pollution — for the five regulated air pollutants and carbon monoxide — is not covered by this fee system.
- The annual per ton fee rates are not great enough to provide any incentive to reduce emissions.

> *We need to put our incentives where our objectives are. . . . There is no way that [environmental taxes] are not part of the answer.*
> — David Buzzelli, Vice President, Dow Chemical Company

The idea of refocusing Minnesota's air emissions program is not new. Two reports by the Minnesota Pollution Control Agency — the *Feasibility of Using Fees to Control Toxic Air Emissions* in 1994 and the 1996 follow-up report with the same title — examine the idea of using fees to reduce emissions.

Household focus groups held by the Pollution Control Agency for its 1996 report concluded that the current fee system for stationary sources appears to be working well. Most groups noted that emission reduction incentives are a valuable feature of emission fees and that the value of the incentive should be correlated to the environmental costs associated with the emissions. Some of the focus groups noted that, "the public would disapprove of a fee system that just takes money from emission sources without actually encouraging emission reductions."

The focus groups also expressed concerns about the equity and fairness of the current fee system only affecting stationary sources, which account for roughly 10 percent of total emissions of all pollutants. However, the groups recognized the potential additional administrative expense and political difficulties of establishing an environmental based emission fee that would cover sources of emissions beyond stationary sources. Both reports

concluded that it is feasible to use user fees as a means to reduce toxic air emissions in Minnesota once certain necessary conditions are met.

A framework for a new approach

Smart Signals suggests that the state adopt a fee system with the objectives of reducing emissions and environmental impacts. This system should:

- Reward businesses, institutions and individuals that reduce emissions, particularly of those pollutants that represent the greatest threat to our communities and environment
- Expand the range of polluters who are required to have permits beyond simply stationary sources, such as power plants
- Adjust fees for various pollutants to take into account their toxicity and overall impact on the environment
- Set fees that aim to reduce pollution, while being conscious of issues of competitiveness
- Include more hazardous air pollutants

Such a system could generate more revenue than would be needed to administer the program. While the intent of this study is not to examine where this additional revenue should be spent, a few options would be to mitigate environmental damage caused by air pollution, develop economic incentives to reduce air pollution or reduce taxes, such as the individual income or corporate income tax, thereby encouraging employment and economic development. It is likely that the political and societal sentiments of having a fee system that incorporates these objectives would be somewhat dependent on how any excess revenues beyond the administrative costs would be invested.

This study builds on the 1994 and 1996 Pollution Control Agency reports by exploring whether an emission fee system can be used to cover both environmental and administrative costs. It illustrates the inequities in the current fee system as well as its ineffectiveness as a possible strategy to encourage the reduction of toxic air emissions. It also identifies and evaluates three alternatives to the current fee program.

The current fee program is complex

Currently, more than 2,000 businesses, institutions or organizations hold air emission permits, according to the Minnesota Pollution Control Agency. Most of them are industrial facilities related to mining, pulp and paper, utilities, refineries and various manufacturing activities — companies that have permits to release certain pollutants into the air pay fees based on their emissions.

Except in special cases, permits are required only when a potential exists to emit more than a specified annual amount, known as the "threshold amount," from one source for a given pollutant. The threshold amounts for the pollutants that are assessed fees are: 50 tons for sulfur dioxide, 100 tons for nitrogen oxides, 100 tons for volatile organic compounds, one-half ton for lead and 25 tons for particulate matter less than 10 microns in diameter. Other, lower, thresholds exist for permits for toxic air pollutants.

Since 1990, the number of permit holders has nearly tripled to just over 2,000, although the total amount of emissions has been relatively stable, between 339,078 tons and 378,096 tons. The growing number of permit holders can be attributed mostly to a larger number of small firms that previously did not have permits, according to the Pollution Control Agency staff. More small firms need permits because regulations initially did not require them to hold permits or because they now have emissions above the threshold level.

The per-ton fee amounts have risen since the program was fully implemented in 1992. The per-ton fee went from $7.79 per ton in 1992 to $22.60 in 1997. During this period, the per-ton fee support of administrative cost was phased in. Today, it supports the majority of the administrative cost of the Minnesota Pollution Control Agency's air program. Revenues generated by the fees were $3.47 million in 1992 and $8.05 million by 1997.

Why does the state collect air pollution emission fees? As mentioned earlier, title V of the 1990 Clean Air Act Amendments requires states to collect fees from air emitters to pay for state permit and air quality programs. States can design their own fee systems as long as fees cover administrative costs.

Based on this federal law, the Minnesota Legislature passed a law that requires annual collection of fees and sets a minimum target for fee proceeds. The law also fixes the inflation rate for fee target increases and requires that the proceeds be spent on administrative costs. The Legislature determines the administrative costs and sets fees every two years. Given this approach, the current pollution emission fee system creates few incentives to reduce emissions, though federal law does not prohibit it from doing so.

How fees are set

A two-step process determines the administrative costs of the current air emissions program and the per-ton fee.

- First, the Legislature determines and approves the program's administrative cost by using a capped emissions total, in tons, and then multiplying that by a $25 per ton rate (this $25 is adjusted for inflation since 1989 and is the minimum required by the Federal 1990 Clean Air Act Amendment.) The capped emissions total is the sum of all emissions from all permitted sources. But in instances where an individual facility has emissions from a given pollutant that exceed 4,000 tons, only 4,000 tons is used to arrive at the capped emissions total.
- In the second step, the actual per-ton fee is set by using the administrative cost calculated in the first step and then dividing by the sum of all emissions (non-capped) from every permitted source.

As an example, assume there are three companies that only emit sulfur dioxide. Company A emits 1,000 tons, Company B emits 2,000 tons and Company C emits 10,000 tons, which totals 13,000 tons.

Using the 4,000-ton cap, Company C's emissions are capped at 4,000 tons. For setting the administrative costs, the total used is 7,000 (1,000 from Company A, 2,000 from Company B and 4,000 from Company C). Now, the 7,000 is multiplied by $25 per ton for an administrative cost figure of $175,000.

Once the program administrative cost is established, the second step is determining the per-ton fee. The per-ton fee rate is simply the number of actual tons emitted (13,000) divided into the cost of administrative ($175,000). The fee rate for this example would be $13.46 per ton, regardless of the source.

Evaluating the current system as a revenue system

This study uses the Minnesota Department of Revenue's five objectives for a model revenue system as the criteria against which the four emission and environmental fee programs can be assessed. A model state and local revenue system should meet the following five objectives: understandable, fair, competitive, reliable and efficient.

Compared to the model revenue system, the current fee program gets mixed reviews, beginning with a low score for understandability. Its approach to setting fees is confusing, especially with the use of the 4,000-ton cap in determining the fee and being unable to predict the rate.

The current emission fee program is not fair. Some polluters do not pay any fees. That's because there are three categories of air polluters, but only one type pays emission fees.

The three categories are:

- Stationary polluters, such as factories and utilities
- Mobile polluters, such as cars, trucks and aircraft, and
- Area polluters, such as waste disposal treatment and recovery facilities.

Despite the fact that all three sources can release large amounts of pollutants, only stationary emitters of criteria air pollutants pay fees if their emissions are above specified levels.

For instance, in 1995, stationary sources accounted for 19 percent of the total criteria emissions (2.2 million tons was the total), according to the Pollution Control Agency. When adding carbon monoxide to the emissions estimate, total emissions jump to 3.9 million tons and the stationary portion is 12 percent.

In addition to fairness concerns regarding who pays and who does not, there are also issues of fairness relating to varying fees according to toxicity and location as well as the problem of applying fees to five criteria pollutants while tons of other toxic pollutants are not assessed fees.

Vary fees according to toxicity: While the current emission fee program assigns a uniform fee to all permitted pollutants, it has been suggested by many individuals that the fees should be associated with their inherent environmental impact and chemical toxicity.

Under the present system, a ton of lead and a ton of sulfur dioxide are assessed the same fee, even though a ton of lead can have a far worse impact on the environment than a ton of sulfur dioxide.

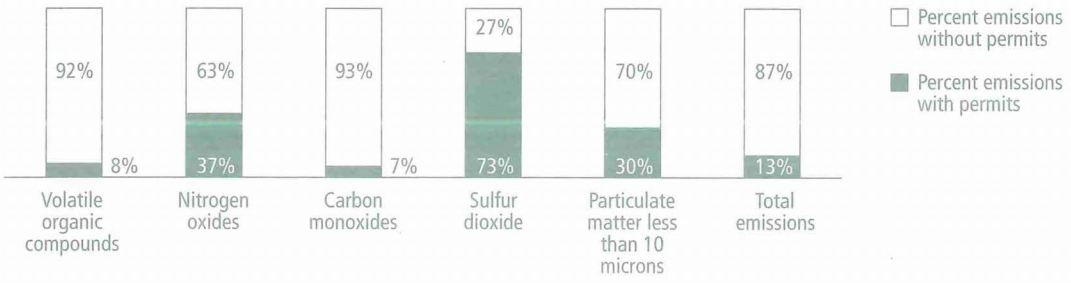
The Pollution Control Agency states in its 1994 report that, "The ideal fee would set fee rates equal to the amount of environmental damage caused by each substance emitted."

Fees that account for local sensitivity: Another suggestion for indexing pollutants based on their potential environmental harm calls for indexing pollutants relative to local conditions. As the 1994 Pollution Control Agency report notes:

"Differences in local conditions are likely to cause differences in local environmental effects. An emission fee based on environmental cost which includes some measure of local sensitivity would fit better with the fairness criterion for model revenue systems."

Exclusion of hazardous air pollutants: Applying fees on five pollutants while not assessing fees on 188 other hazardous air pollutants is another fairness issue.

A SMALL FRACTION OF AIR EMISSIONS WERE REGULATED WITH PERMITS IN 1997



In 1997, the majority of air emissions came from sources that were not required to have permits.

Note: Information for lead was not available for all sources and was therefore omitted. Fees are not currently charged for carbon monoxide because it is significantly less toxic on a per-ton basis than the other pollutants, and because it is emitted primarily by mobile sources. It is, however, a criteria pollutant and a significant problem in the Twin Cities. Other fairness and equity concerns have been raised about varying the fees according to toxicity, local sensitivity and the exclusion of 188 hazardous air pollutants from any fee.

Source: Minnesota Planning, Pollution Control Agency and the U.S. Environmental Protection Agency

The Pollution Control Agency noted in its 1996 report that "people object to emission fee systems that impose costs on relatively few sources, while a larger number of sources are exempted."

Based on these concerns, the Pollution Control Agency has discussed the possibility of expanding the emission fee program to include some or all of the 188 hazardous air pollutants. Most of the 188 hazardous pollutants are also volatile organic compounds or particulates. For this reason, the issue of "double counting" must be addressed when expanding the list to toxic pollutants.

Given the fact that most, if not all, states have some emission fee system which applies to their criteria pollutants, competitiveness is not a major concern for domestically sold goods.

From a global perspective, this fee program is likely to be more lenient than programs in some European countries, while it is likely to be stricter than programs in most Southern Hemisphere countries. However, according to recent articles in *Harvard Business Review,* competition would not be hampered if an emission fee program were constructed correctly.

This program's annual fees, which fluctuated from $7.79 per ton in 1992 to $22.60 per ton in 1997, are a reliability concern, specifically when a firm decreases emissions and their emission fee increases. Most firms would prefer to have a fee system with more predictable rates.

With regard to efficiency, this program does well at keeping costs low for the fee payer by minimizing administration costs.

Evaluating the current fee system as an incentive to reduce pollution

The features of the current fee system which make it acceptable as a way to cover the administrative costs of regulatory programs make it unacceptable as a means of encouraging reductions in emissions.

The formula for determining emission fees is structured such that fee rates "have a disturbing tendency to rise when total emissions fall," according to the Pollution Control Agency's 1994 report. Therefore, a decrease in a firm's emissions can still result in an increase in per-ton fee rates from one year to the next. In addition, using the cap hurts permit holders that emit less than 4,000 tons and benefits permit holders that emit more than 4,000 tons. Without the 4,000 ton cap in the fee formula, in some instances, the per ton fee would be lower for polluters of less than 4,000 tons.

The following is an example of how fee rates can rise when total emissions fall and how facilities that emit less than the 4,000 ton cap are placed at a disadvantage.

Assume there are three companies, A, B and C, and that they all emit sulfur dioxide.

In year one, Company A emits 1,000 tons, Company B emits 2,000 tons and Company C emits 10,000 tons.

In year 2, Company A emits 1,000 tons, Company B emits 2,000 tons and Company C reduces its emissions in half and therefore emits 5,000 tons. When comparing year 1 and year 2, the total emissions from all three sources fell from 13,000 tons to 8,000 tons, but when calculating the per-ton fee (the previous example illustrated how to make that computation) it rose from $13.46 in year 1 to $21.88 in year 2.

Here is a case where emissions fell, but the per-ton fee rose. Another point of interest between year 1 and year 2 is that Company A's total fees paid (calculated as total emissions times the fee per ton) increased from $13,460 to $21,880 despite emitting the same 1,000 tons. Similarly, Company B's total fees paid increased from $26,920 to $43,760 despite

emitting the same 2,000 tons. And, Company C's total fees were reduced from $134,600 to $109,400 while it cut emissions in half from 10,000 tons to 5,000 tons.

Now, in year 3, Companies A and B both cut their emissions in half, so that equates to 500 tons of total emissions for company A and 1,000 tons of total emissions for company B. Company C emits 10,000 tons just as it did in year 1.

In this case when the total emissions of all three companies falls from 13,000 in year 1 to 11,500 in year 3, the per-ton rate falls from $13.46 to $11.96. This shows that per-ton rates do not always increase when total emissions fall. This reduction in the per-ton fee meant that the total fees paid by all three companies were reduced from year 1 to year 3, even for Company C, which emitted 10,000 tons in both years.

Comparing the outcomes of year 1 and 2 to that of years 1 and 3 reveals that facilities that emit less than the 4,000-ton cap are placed at a disadvantage to those facilities that emit more than the 4,000 ton cap.

Between years 1 and 2, Company C cut its emissions in half and reduced its total fees while companies A and B did not change their emissions, yet had to pay out more money in fees. However, between year 1 and 3, when companies A and B cut their emissions by half and reduced their total bill, Company C also benefited despite not reducing its emissions.

In this example, regardless of which company reduces their emissions, Company C (which emits more than the 4,000 ton cap) always benefits. However, companies A and B can only benefit when they reduce their emissions and Company C does not. When

REDUCING EMISSIONS DOES NOT ALWAYS LOWER FEES

		Year 1	Year 2	Year 3
COMPANY A	Emission tons	1,000	1,000	500
	Capped emission tons	1,000	1,000	500
	Total fees paid	$13,460	$21,880	$5,980
COMPANY B	Emission tons	2,000	2,000	1,000
	Capped emission tons	2,000	2,000	1,000
	Total fees paid	$26,920	$43,760	$11,960
COMPANY C	Emission tons	10,000	5,000	10,000
	Capped emission tons	4,000	4,000	4,000
	Total fees paid	$134,600	$109,400	$119,600
Total actual tons of emissions		13,000	8,000	11,500
Total emissions with 4,000 ton cap		7,000	7,000	5,500
Total administrative cost		$175,000	$175,000	$137,500
Fees per ton		$13.46	$21.88	$11.96

Emission reductions do not necessarily equate with expected outcomes. For example, between years one and two, Company C reduces its emissions from 10,000 tons to 5,000 tons, but the per-ton fee rate increases for all three companies despite no emissions changes by companies A or B.

Source: Minnesota Planning

Company C reduces its emissions and Companies A and B don't change their emissions, Companies A and B lose because they pay higher per-ton fees.

With regard to size of fee payments, smaller polluters are effectively put at a disadvantage by the performance of larger polluters. Conversely, larger polluters will always gain financially from improved environmental performance taking place in other companies. As a result there is no consistent relationship between the fee system and incentives to reduce pollution emissions.

Based on this example, the current fee system which exists to cover administrative costs, would not send an economic signal to polluters to reduce emissions. In fact, the Pollution Control Agency noted in its 1994 report, "As long as fees are fixed in relation to administrative cost, fee payers can argue, with some justification, that fees provide no or little emission control incentive. Some fee payers may actually be better off if they do not reduce emissions because doing nothing may slow the rate of fee increases."

Analysis of alternatives to the current air emission systems

There is no quick fix here. While this analysis does not attempt to select the "best" emission fee system, it provides a cursory examination of three options to the current system. Each approach has advantages and disadvantages, so no one system stands out as the obvious choice. The three alternative systems are a carbon-tax fee, a flat fee per ton and a fixed and variable fee.

- A carbon-tax fee system
- A flat fee per ton
- A fixed and variable fee system

After a description of the three systems, the Minnesota Department of Revenue's five criteria for a model revenue system is used to analyze each option.

This study also compares how much revenue each option would have been expected to generate between 1992 and 1997. The alternatives are:

Fee program based on carbon emissions: Taxing pollution based on carbon dioxide emissions is another approach that has been discussed often. While basing fees on carbon content may be easier to implement than the current system, it has the potential to be far more controversial. A carbon-based fee could be structured in two ways. Fees could either be assessed on carbon-based inputs, such as coal or gasoline, or fees could be assessed on output, the amount of carbon dioxide emissions.

Based on 1996 carbon dioxide emissions data from the Pollution Control Agency, approximately 80 percent of total emissions (127,417,000 equivalent tons was the total) could be attributed to the combustion of fossil fuels. Note that this total may change slightly as new carbon dioxide emissions categories are added and as calculative procedures change.

Environmental cost (externality) estimates of carbon dioxide emissions from the Energy Information Administration range from 30 cents to $40 per ton. Most estimates were between 30 cents and $24. In Minnesota, a range of 30 cents to $3.10 per ton (in 1995 dollars) was determined as the environmental cost, according to the Public Utility Commission.

For this assessment, the carbon dioxide-based fee would be fixed at one set rate per-ton for all carbon dioxide emission sources.

Flat fee of $25 per ton of criteria pollutants: This fee system is similar to the current fee system, in that the $25 per ton fee is close in magnitude to the per ton fee amounts in recent years. In addition, it is assumed that a $25 flat fee would only be assessed on stationary sources, due to the difficulty of applying such a fee on mobile and area sources.

Fees could be assessed for the current five criteria pollutants as well as the 188 hazardous air pollutants, which are currently not assessed any fees.

Fixed and variable fee program: The pollution emission fee system could include a component to cover fixed (or administrative costs) and a variable component to pay for environmental costs. Though it may be difficult to establish an acceptable variable component, such a fee could serve as an incentive to reduce emissions.

While it has the potential to be more complex than the current system, this type of fee system could be applied to at least some area and mobile sources as well as all stationary sources. For example, automobiles could have a fixed fee and then a variable fee which relates to fuel efficiency and emissions.

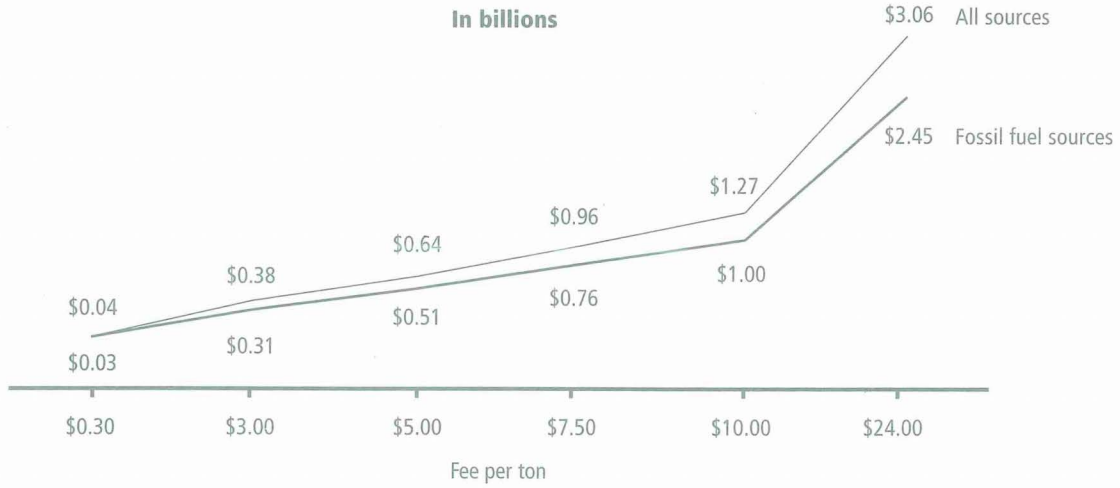
A fixed-and variable-fee-based system would address many of the issues of concern with the current system — such as when a firm's emissions decrease the per-ton fee increases. The environmental component would apply fees based on toxicity and the location of emissions. Fees could be assessed on all of the 188 hazardous air pollutants. Because emission data for most hazardous air pollutants is incomplete and estimates of costs to the environment and public health are still being developed, this analysis could not create a revenue scenario under this system for all hazardous air pollutants but only one for environmental fees applied to the criteria pollutants.

Under the fixed- and-variable-fee-based scenario, emission fees would have been almost $205 million in 1995 — 33 times more than what was generated that year. What is of greatest interest is the wide disparity between fee rates based on administrative costs ($6.4 million) and potential environmental harm to the environment and public health ($198.6 million).

Comparison to Department of Revenue's model revenue system

This study uses the Minnesota Department of Revenue's five objectives for a model revenue system as the criteria

REVENUES GENERATED BY 1996 CARBON DIOXIDE EMISSIONS VARY DEPENDING ON WHICH FEE IS SELECTED



The wide range of estimated environmental costs associated with carbon dioxide has the ability to produce an incredible amount of revenue. Given that fossil fuel combustion sources accounted for roughly 80 percent of carbon dioxide emissions in 1996, a fee focused on those polluters would have the potential to reduce a dramatic amount of emissions.

Source: Minnesota Planning, Pollution Control Agency and Public Utility Commission

against which the four emission and environmental fee scenarios can be assessed. A model state and local revenue system should meet the following five objectives: understandable, fair, competitive, reliable and efficient. In addition, each system is examined for whether or not it sends economic signals to reduce emissions.

Carbon-based fee: This program gets mixed reviews when weighed against the model revenue system outlined by the Minnesota Department of Revenue. Constructing a carbon dioxide-based fee system with a set fee applied to all sources would be clear and understandable.

Applying the fee to all sources of carbon dioxide emissions would be considered fair, rather than only applying the fee to fossil fuel burning sources. However limiting the fee only to carbon dioxide polluters would not be fair since it would disproportionately affect those industries and activities that are carbon intensive, while activities that emit other hazardous pollutants would not be assessed.

As for the competitive issue, some believe a carbon-based fee would put Minnesota and its businesses at a competitive disadvantage with other states and countries. Others believe a carbon tax would encourage efficient production processes and promote lifestyles that are more energy- and resource-efficient. Ultimately, this could result in a higher quality of life and give Minnesota businesses a competitive advantage.

The Model Revenue System requires that a "revenue system be stable, sufficient and certain." Given this, a carbon fee would not be reliable because the program would encourage the reduction of carbon, which would presumably yield a decreasing revenue stream over time. If the goal is pollution reduction however, this is clearly a desired outcome. From the fee payer's perspective, a carbon fee would most likely be reliable, if the fee were kept at a certain level rather than changed every year to maintain a certain revenue stream.

The fee amount selected and the cost of administering the program would largely determine if a carbon-based fee program is efficient or not. If the revenues generated by the fees were equivalent to the administrative costs, then the Department of Revenue is likely to say that the program is efficient.

The amount of the per-ton fee would determine whether this fee program was sending an economic signal to reduce pollution. Regardless of whether a signal is sent or not however, this program's focus on

FEES BASED ON ESTIMATED ENVIRONMENTAL COSTS YIELD FAR GREATER REVENUES THAN FEES UNDER THE CURRENT SYSTEM, 1995

Pollutant	Emissions released in tons	Estimated environmental cost per ton	Revenues based on estimated environmental fees (in millions)	Revenues based on current fee program at $18.30 per ton (in millions)
SO_2	111,000	$67	$7.4	$2.0
NO_x	144,000	$224	$32.3	$2.6
VOCs	38,000	$86	$3.3	$0.7
Lead	62	$1,876	$0.1	$0.001
PM10	55,000	$2,828	$155.5	$1.0
Total			$198.6	$6.4

Revenues generated using fees based on estimated environmental costs amount to nearly $200 million compared to revenues of just over $6 million under the current system.

Source: Minnesota Planning and Pollution Control Agency

carbon dioxide is problematic because it has no chance at sending any type of pollution reduction signal to those emitting other types of pollutants.

Flat per-ton fee: Given a flat fee of $25 per ton, this program's fee system would be far more understandable than the current system. The benefit of a flat fee is that fee payers are likely to view it as understandable and predictable.

With regard to fairness, many of the same concerns that were noted about the current fee program apply here. The assumption that this fee would likely only apply to stationary sources and that the fee does not link to toxicity and location sensitivity is worrisome.

Given the fact that the current system's fees have been relatively close to $25 per ton, competitiveness concerns of a system with a flat fee of $25 are likely to be limited. In fact, a flat fee may benefit companies and increase their competitiveness because it may enhance their long-range planning ability. This leads to the program having greater reliability and less uncertainty. Reliability in regulations is likely to yield greater acceptance of the regulation.

A fee system with a $25 per-ton fee would likely be efficient considering its cost similarity to the current system's fees.

A $25 per-ton fee is likely to be too low to send an economic signal encouraging firms to reduce emissions. Setting a flat fee equal to the cost of reducing the next ton of emissions for a given polluter would address this incentive concern. However, this is difficult to determine given the wide spectrum of firms. This program would do little to benefit the equity, toxicity and location issues.

Fixed and variable fee: To subject this system to the Department of Revenue's criteria, this analysis assumes the fixed component is based on the current emission fee system and the variable component would be based on a fee indexed for toxicity and location for all hazardous air pollutants, respectively. This program would be applied to all stationary sources, and where possible, area and mobile sources would be included as well.

Establishing a system that charges fees according to a pollutant's toxicity and location would presumably make more sense than a system that ignores these variables, and thus would be more understandable. However, establishing a variable component given our current understanding of the toxicity and locality relationship to environmental and human health costs would be challenging.

Compared to the other three approaches, this method appears to be the fairest. Depending on the extent that these fees could be applied to area and mobile sources would determine the level of fairness.

This system would likely result in a dramatic increase in rates that fee payers would consider excessive and unneeded. However, from the perspective of the Department of Revenue, a fair tax is one where payments for services reflect benefits received by the taxpayer. So in this case, the environmental component of the program would represent the harm done to the environment by the emissions of pollutants and therefore would be justified.

Establishing a fixed and variable fee system without similar taxes in the other 49 states could undermine a portion of Minnesota business competitiveness and the ability to attract new businesses to Minnesota.

The anticipated outcome of such a program has drawn mixed reviews. Some people feel that Minnesota businesses would be put at a competitive disadvantage, while others believe a correctly configured emission fee system would yield a competitive advantage for firms. This report does not

address how emission fee proceeds should be spent, though the answer to that question would have a large bearing on this competition issue. In addition, different sectors of the business community would likely realize different effects, depending on their emissions and the fee associated with those emissions.

The system addresses one reliability question while creating another. While firms would no longer see fees increase as emissions fall, the revenue stream from the environmental component is likely to be highly variable. This would occur because the variable component would likely create an incentive for firms to reduce emissions. This would primarily be a concern for the Department of Revenue, not for polluters. While this is seen as a negative based on the department's criteria, the scenario is likely to be seen as a positive when viewed with the goal of emissions reductions in mind.

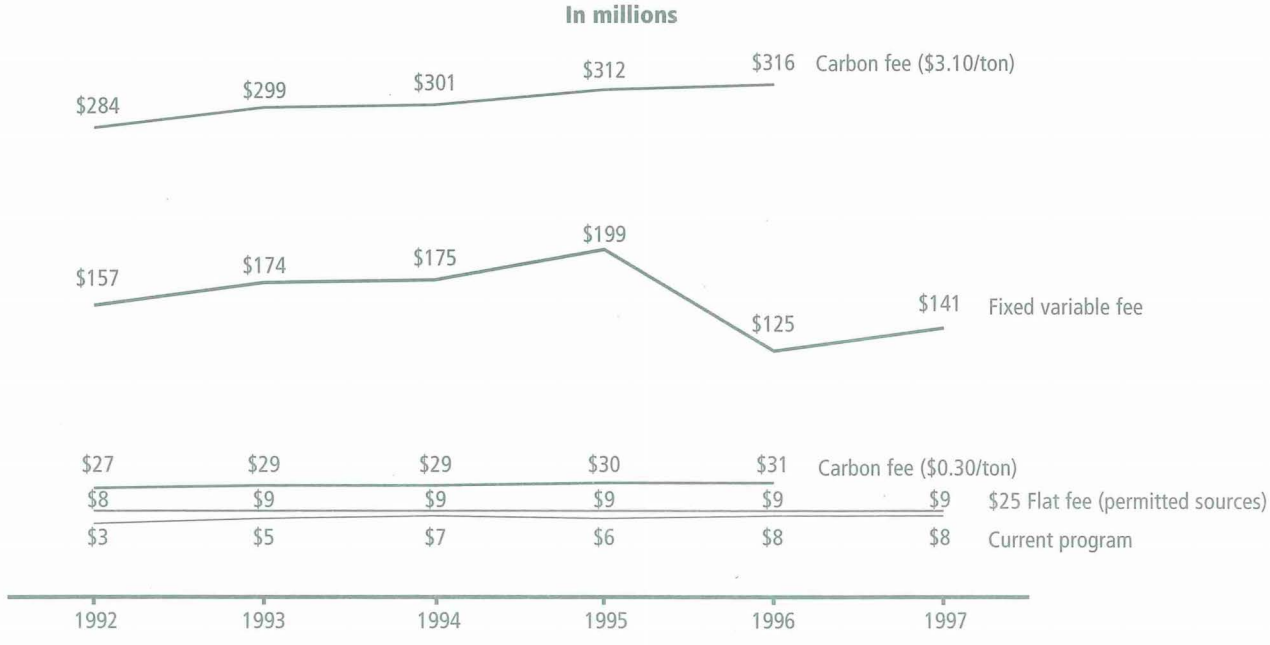
With regard to efficiency, the administrative costs of this program are likely to increase with the expansion of the program and higher fees. With additional revenue being generated it is likely that there would be money to be invested in a number of areas. The exact use of these fee proceeds would affect the program's efficiency.

With regard to whether this system would send an economic signal to reduce emissions, the answer is that it could. If it is determined that the fixed and variable (environmental) costs are greater than the costs of reducing the next ton of pollution for a firm then a pollution reduction signal would be sent. However, if the environmental costs and the fixed costs are lower than the marginal cost of emissions for a firm, than a "keep polluting" signal would be sent.

Revenue comparison

The emission fee models discussed in this study differ in their makeup and their potential revenues. Each program's expected revenue generation was determined using the following assumptions: For a carbon dioxide-based program, only fossil fuel

A COMPARISON OF THE VARIOUS FEE PROGRAMS DISPLAYS A WIDE DISPARITY IN REVENUES GENERATED



Two fee programs — $3.10 carbon dioxide, fixed and variable fees — generate much higher revenues than the other options.
Source: Minnesota Planning, Pollution Control Agency and Public Utility Commission

burning emissions were assumed to be subject to either a $0.30 or $3.10 fee. Note, no data was available for 1997 carbon dioxide emissions. The fixed and variable program uses actual emissions totals from the criteria pollutants as well as their estimated environmental (externality) costs. The flat fee program is based on actual emissions from the criteria pollutants as well as a constant $25 fee. And the current program generates revenues based on the actual emissions and fees.

When comparing revenues based on a carbon program with $3.10 per ton fees and the fixed and variable programs revenues to the rest of the program's revenues, there is an enormous difference in revenue generation. In 1996, the range was $316 million for a carbon dioxide program with a $3.10 per ton fee. This compares to only $8 million under the current program. If the estimated externality costs to the environment are accurate, the difference in potential revenue collected between the current system and a system which includes costs of environmental damage represents a dramatic misassignment of per-ton fee rates, if emitters are expected to pay for the harm caused by their emissions.

The $25 flat fee generates revenues that closely resemble revenues from the current emission fee program. In conducting these comparisons, it is assumed that emissions would not have changed if a different program was applied. In actuality, emissions could have changed, depending on which fee model was used.

Conclusion

The Minnesota Legislature should broaden the objectives of Minnesota's air emission fee program to include emission reductions and environmental protection. While the three alternatives to the existing program have benefits and drawbacks, they nonetheless illustrate options for structuring an air fee program that would meet the objectives of covering administrative costs and create an economic signal to reduce emissions.

GLOSSARY

capital gains Wealth created by the appreciation in value of an asset such as a home or land.

capitalization A calculation which determines how the current price of an asset is affected by future flows of benefits and costs. For example, an increase in property tax rates reduces the value of a home. The increase in the stream of future property tax payments are "capitalized" into the value of a home thereby reducing its price. Similarly, a reduction in property tax payments on a house increases the value of a home. The savings are "capitalized" into the value of the home resulting in a higher home price.

chain-of-custody The verification process along the wood products supply chain, from harvest to sale, that distinguishes certified from non-certified wood.

discount rate The interest rate used to adjust for the fact that a dollar next year is worth less than a dollar today. Often based on what alternative investment returns could be achieved if funds were put to a different use. Allows future revenue streams to be evaluated in terms of current dollars.

exclusionary zoning Zoning ordinances which limit the ability of lower-income individuals to reside in a particular area. Examples include required development features (such as minimum lot sizes and three-stall garages) or limitations on commercial apartment construction.

greenhouse gas A heat-trapping gas that accumulates in the upper atmosphere. The heat is reflected back to earth, producing an increase in the earth's temperature. The most important of these gases are carbon dioxide, nitrous oxide and methane. These gases are produced primarily through the combustion of carbon-based fuels (coal, oil and natural gas) and through livestock production.

gross state product The value of all goods and services produced within the borders of a state during a particular period of time.

gross domestic product The value of all goods and services produced within the borders of a nation during a particular period of time.

marginal cost of land ownership The cost of owning an additional increment of land above a given lot size.

natural capital The largest form of capital, made up of resources (such as oil, fish and timber), living systems (for example wetlands, forests and lakes) the services natural systems provide (including the continual exchange of carbon dioxide and oxygen among plants and animals, or the carbon cycle).

nonrenewable resources Resources, such as oil or coal, that cannot be replenished or regenerated.

opportunity cost The forgone return from other investments that could have been made when a decision is made to invest money in one area.

property classification system The establishment of different property tax rates based on how the property is used (residential, commercial, industrial, and so forth). An important feature of the Minnesota property tax system.

renewable resources Resources, such as trees or water, that have the ability to regenerate themselves or be replenished for future use.

site value taxation A property tax reform which increases the tax rate on the land value portion of real property and decreases the rate on the building value portion of real property.

tax exemption An instance where goods or services are, by law, not subject to tax.

tax expenditure A situation where the law calls for a lower tax than would otherwise be collected. The law may accomplish this reduction in revenue through an exemption, deduction, credit, reduced rate or other mechanism.

taxing jurisidiction A governmental entity that provides services to residents in an area and whose revenues are based in part on property taxes.

underemployment A job that does not fully use one's skills or is part-time when full-time employment is desired.

value-added The incremental increase in a product's value after it has been improved in some fashion.

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