Clearing the Air With Transit Spending

SIERRA CLUB GRADES AMERICA'S FIFTY LARGEST CITIES

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CLEARING THE AIR WITH TRANSIT SPENDING
Sierra Club Grades America's Fifty Largest Cities

Acknowledgements

"Clearing the Air With Transit Spending," the Sierra Club's fourth report on sprawl, is also available on the Web at: *www.sierraclub.org/sprawl/report01/*.

To read last year's report, "Smart Choices or Sprawling Growth: A Fifty State Survey of Development," the earlier two reports or to find out more about the Sierra Club's Challenge to Sprawl Campaign, please visit *www.sierra-club.org/sprawl/*.

This project was made possible through the hard work of many Sierra Club volunteers and staff, including:

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Our thanks to all who contributed to this report.

COVER PHOTOGRAPH OF CHICAGO BY ROBERT GLUSIC

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EXECUTIVE SUMMARY

Our cars pollute less than they used to, but smog is still a serious problem. How did that happen? For one, in many places there are simply more of us, and that means more pollution. But we are also making bad decisions about how we grow. The sprawling development of our suburbs and cities is forcing us to drive farther and more often. Add to that the fact that cities are choosing to expand and build more roads instead of investing in clean public transportation, and it becomes obvious why smog and the quality of our air are still big problems.

In this report, the Sierra Club has graded America's largest cities[1] on the smog[2] from their transportation systems by looking at the amount of smog coming from cars and trucks per resident in relation to the cities' spending on public transportation. We found a clear relationship between increased investment in public transportation and decreased per person vehicle smog. The more our nation spends on reducing the number of drivers and the amount of time drivers spend on the road, the cleaner and healthier our air will be.

Despite Efforts, Smog Remains a Serious Health Problem

Smog is a serious public health threat. Twenty percent of our population lives in areas where doctors and scientists say the air is not deemed safe to breathe. Exposure to smog has been implicated in a range of illnesses and conditions, from asthma to pneumonia.[3] It may also worsen sinusitis and hay fever, and may trigger or aggravate cancer and emphysema. For people who live in the most polluted places, smog levels can be life-threatening.

We have long recognized smog as a problem. Despite that, smog has actually increased in a number of regions in the past 10 years.[4] In fact, only 10 to 14 of 207 polluted cities (fewer than 5 to 7 percent) saw a reduction in their air pollution in the 1990s.[5]

As a nation we've undertaken a variety of efforts to clean our air since the 1960s and 70s. In fact, we've made progress in creating "cleaner" cars. Cars today are typically 70 percent to 90 percent cleaner (depending upon the vehicle and pollutant being measured) than their uncontrolled counterparts of the 1960s. However, this gain is cancelled out primarily for two reasons. For one, half the new vehicles sold in the United States are SUVs or other light trucks, which produce more smog-causing pollution than cars because they get fewer miles per gallon. The boom in SUV ownership has meant that the fuel economy of the U.S. vehicle fleet is at its lowest point since 1980. And two, people are driving more.

Sprawl Forces Us to Drive Everywhere

Why are people driving more? Poorly planned development is leading to sprawl, lengthening trips and forcing us to drive more often. The average American driver spends 443 hours per year—the equivalent of 55 eight-hour workdays (more than 10 work weeks)—stuck in traffic. Residents of sprawling communities drive three to four times as much as those living in compact, well-planned, walkable areas. Adding new lanes and building new roads just makes the problem worse. Studies show that increasing road capacity only attracts more traffic and causes more sprawl.[6] As sprawl increases our reliance on cars and driving, it makes our air dirtier and less healthy.

MORE TRANSIT, LESS DRIVING: In the Portland metro area, the Tri-County Metropolitan Transportation District has increased monthly ridership for 12 consecutive years. Between 1990 and 1999, Tri-Met ridership outstripped vehicle miles traveled in the metro area.

Making the Clean Air Grade

The Sierra Club researched and evaluated the steps our nation's largest cities are taking to help people drive less and create cleaner air. In the context of each city's total smog problem, we analyzed the proportion of smog coming from cars and trucks per resident, and the amount spent in that state to promote more public transportation choices. We then graded each of our nation's largest cities on these two criteria:

(1) smog from cars and trucks in their city, and

(2) the extent to which they are taking advantage of the opportunity to clean up their air by focusing state spending on clean transportation choices as opposed to building new roads.

Our research reveals that the more states spend on public transportation, the less car and truck smog is created per person in our largest cities. The chart on the facing page tells the story.

Reports by regional air districts were used to determine grades for the 50 largest cities for smog from cars and trucks. This allows us to see the part of the air pollution problem for each city coming from car and trucks. Grading cities based on smog per person from cars and trucks shows how well they are reducing pollution from their transportation systems. Based on the pounds of smog from cars and trucks per person annually, the grading scale used here is:

```
0-25 . . . . . . . . . . . . . A
26-50 . . . . . . . . . . . B
51-75. . . . . . . . . . . C
76-100. . . . . . . . . . D
101 and up. . . . . . . F
```

The grading on transit funding is based on the amount spent per city resident on transit for every $100 spent on highways per person statewide. This shows how much a state balances spending on cleaner transportation alternatives versus more polluting road construction. We used the following grading scale:

```
$101 and up. . . . . A
$81-100. . . . . . . . B
$61-80 . . . . . . . . . C
$41-60. . . . . . . . . D
$0-40 . . . . . . . . . . F
```

These two grades were then averaged using the following grading scale to produce a final grade (with half point increases/decreases for pluses and minuses):

```
4 points . . . . . . . . . A
3 points. . . . . . . . . B
2 points. . . . . . . . . C
1 point . . . . . . . . . D
0 points. . . . . . . . . F
```

BUS ME OUT TO THE BALLGAME:
Denver is one of many cities that have built new baseball stadiums downtown, and rely primarily on public transit to get fans to the games.

The more states spend on public transportation, the less car and truck smog is created per person.

CITY [7]	CLEANING THE AIR WITH TRANSPORTATION SPENDING CHOICES	SMOG FROM CARS AND TRUCKS (PER PERSON)	AMOUNT SPENT ON PUBLIC TRANSIT VS. HIGHWAYS (PER PERSON)
New York-N. New Jersey, N.Y.-N.J.	B+	C+	A (N.Y)
Washington, D.C., Metro	B-	C-	B
Buffalo-Niagara Falls, N.Y.	C+	D	A
Rochester, N.Y.	C+	D	A
Chicago-Gary-Kenosha, Ill.-Ind.	C	C	C (Ill.)
Los Angeles-Riverside-Orange County, Calif.	C-	C	D
San Diego, Calif.	C-	C	D
San Francisco Bay Area, Calif.	C-	C	D
Baltimore, Md.	D+	C-	D
Philadelphia-Atlantic City-Trenton, Pa.-N.J.	D+	D+	D (Pa.) C (N.J.)
Sacramento Metro, Calif.	D+	C-	D
Boston-Worcester-Lawrence, Mass.	D	D	D
Las Vegas, Nev.	D	C	F
Pittsburgh-Beaver Valley, Pa.	D	D	D
Portland, Ore.	D	D	D
Providence (All Rhode Island)	D	C	F
Denver, Colo.	D-	D+	F
Miami-Fort Lauderdale, Fla.	D-	C-	F
Seattle-Tacoma-Bremerton, Wash.	D-	D-	D
Atlanta, Ga.	F	F	F
Austin, Texas	F	D	F
Charlotte-Gastonia, N.C.	F	D	F
Cincinnati-Hamilton, Ohio-Ky.	F	F	F (Ohio) F (Ky.)
Cleveland-Akron-Lorain, Ohio	F	D-	F
Columbus, Ohio	F	F	F
Dallas-Fort Worth, Texas	F	D	F
Detroit-Ann Arbor-Flint, Mich.	F	D-	F
Grand Rapids, Mich.	F	D-	F
Greensboro—Winston-Salem—High Point, N.C.	F	F	F
Hartford (Greater Connecticut)	F	D	F
Houston-Galveston-Brazoria, Texas	F	D	F
Indianapolis, Ind.	F	F	F
Jacksonville, Fla.	F	D-	F
Kansas City, Mo.-Kan.	F	F	F (Mo.) F (Kan.)
Louisville, Ky.	F	F	F
Memphis, Tenn.	F	F	F
Milwaukee-Racine, Wis.	F	D-	F
Minneapolis-St. Paul, Minn.	F	D-	F
Nashville, Tenn.	F	F	F
New Orleans, La.	F	D	F
Norfolk-Virginia Beach-Newport News, Va.	F	D	F
Oklahoma City, Okla.	F	F	F
Orlando, Fla.	F	D-	F
Phoenix, Ariz.	F	D	F
Raleigh-Durham-Chapel Hill, N.C.	F	D	F
Richmond, Va.	F	F	F
St. Louis, Mo.	F	F	F
Salt Lake City, Utah	F	D	F
San Antonio, Texas	F	D-	F
Tampa-St. Petersburg-Clearwater, Fla.	F	D	F
West Palm Beach, Fla.	F	D-	F

Spending to Offer Public Transportation Choices Creates Cleaner Air

This analysis points out the striking connection between pollution from transportation and spending on transportation choices. New York state, for example, received a high grade in terms of its spending on public transit, and is the only state in this grading that spends more money on alternatives than on new roads. At the same time, the New York City metropolitan area has the least amount of smog per person from cars and trucks. Oklahoma City received a low grade for having a high amount of smog from cars and trucks per person, while the state spends a paltry $5.80 on public transit for every $100 it spends on highway and road construction. Oklahoma completely fails in terms of spending on transportation choices versus roads.

Seven of the 12 cities with the highest grades for low car and truck smog per person—New York, Chicago, Los Angeles, San Diego, San Francisco, Sacramento and Washington, D.C.—are located in one of the five highest graded states for spending on clean transportation choices. This demonstrates the power of public transit as a tool in combating air pollution.

This research illustrates that providing people more transportation choices can significantly reduce automobile use, thereby reducing smog and the accompanying effects on public health. Conversely, limiting transportation choices by continuing to disproportionately fund new highway construction leads to ever more sprawling development and air pollution that threatens our well-being.

Our Leadership Should Stop Sprawl for Cleaner Air

Spending money on public transportation is a good investment that responds to public demand. According to the American Public Transportation Association (APTA),

residents are increasingly turning to public transportation. In the past five years, public transportation ridership has increased by 21 percent.[8] Clearly, the public wants clean air and more public transportation choices It is up to state and local governments to provide these options.

The Sierra Club recommends that the state and federal government:

> Increase the amount of money set aside for public transit and at least equalize funding between public transit and highways.

> Plan development wisely to shorten car trips and facilitate public transportation.

> Support public involvement in the transportation and land-use planning process.

Individuals can act now for cleaner air:

> Combine trips when you are running errands.

> Walk, bike, use public transit where available or carpool to work.

> Live near your work and near public transportation.

> Demand more public transportation choices in your community.

> Talk to decision-makers about the need for increased investments in public transit.

By better balancing transportation spending between roads and less-polluting public transportation, like rail transit and clean buses, we can reduce the number of miles people have to drive, provide Americans more transportation choices and better reflect America's priorities for clean air, good health and enhanced quality of life.

CHAPTER 1:
Sprawling Development Harms Our Health

Poorly planned development is threatening our health, our environment and our quality of life. Land-use decisions—where we build offices, homes, shops, schools and other buildings—influence the building of roads, transit and other transportation modes, and vice-versa. It is a relationship that can lead either to safe, walk-able, diverse, vibrant communities—or out of control, poorly planned suburban sprawl. Unfortunately, sprawl has been winning out.

As we sprawl farther from community and city centers, Americans are forced to drive more often and greater distances. As we sprawl more, we drive more. And as we drive more, we pollute more. Vehicle smog is one of the main pollutants increased by sprawl.

Smog. Even the Name Sounds Bad.

Smog. It looks bad. It smells bad. In the short term, living with smog-filled air causes burning eyes, throat irritation and difficulty breathing. Over the long term it can lead to chronic lung disease, asthma attacks, debilitation, even death. Smog is a public health problem plaguing America's largest cities.

To address smog, Congress passed the Clean Air Act in 1970. While progress has been made, many cities continue to have significant air pollution problems. In 1990 the Act was updated, but of 207 cities analyzed between 1990 and 1999, only 10 to 14 have seen a reduction in smog, while 17 to 25 have seen an increase.[10] The remaining 170+ have seen no significant change. In 1999, 62 million people (more than 20 percent of the population) lived in areas where the air was not deemed safe to breathe.

Of the 21 metro areas with air pollution exceeding U.S. Environmental Protection Agency standards for smog, nine cities, home to 57 million people, are considered "severely" polluted, experiencing peak smog levels that exceed the health standard by 50 percent or more.[11]

CITIES WITH UNSAFE AIR

Atlanta, Ga.[c]

Baltimore, Md.[b]

Boston-Worcester-Lawrence, Mass.[c]

Buffalo-Niagara Falls, N.Y.[e]

Chicago-Gary-Kenosha, Ill.[b]

Dallas-Fort Worth, Texas[c]

Hartford (Greater Connecticut)[c]

Houston-Galveston-Brazoria, Texas[b]

Los Angeles-Riverside-Orange County, Calif.[a]

Louisville, Ky.[d]

Milwaukee-Racine, Wis.[b]

New York-N. New Jersey, N.Y.-N.J.[b]

Philadelphia-Atlantic City-Trenton, Pa.-N.J.[b]

Phoenix, Ariz.[c]

Pittsburgh-Beaver Valley, Pa[d]

Providence (All Rhode Island)[c]

Sacramento Metro, Calif.[b]

San Diego, Calif.[c]

San Francisco Bay Area, Calif.[f]

St. Louis, Mo.[d]

Washington, D.C., Metro[c]

a	"Extreme Nonattainment" designation for ozone by U.S. EPA.
b	"Severe Nonattainment"
c	"Serious Nonattainment"
d	"Moderate"
e	"Marginal"
f	"Other"

WHAT IS OZONE?

Ground-level ozone or smog is created when two types of gases—nitrogen oxides (NOx) and volatile organic compounds (VOCs)—are exposed to heat and sunlight. NOx are created through the burning of coal, gasoline and other fuels. Some VOCs are fuel components themselves (such as gasoline fumes), others are created by burning. These gases generally come from either "mobile" sources, such as cars, trucks, construction equipment, other motor vehicles, gas lawnmowers and leafblowers or "non-mobile" sources, such as oil and chemical processing plants, dry cleaners, off-gases from painted surfaces and household products like hair-sprays and barbecue lighter fluid.

Between 1900 and 1970, NOx and VOCs increased 690 percent and 260 percent respectively.[9]

Smog Is a Significant Public Health Threat

Every day researchers learn more about the health impacts of smog. Exposure to smog has been implicated in a range of illnesses and conditions, including asthma, bronchitis, heart disease, emphysema and pneumonia.[12] It may also worsen sinusitis and hay fever, and may trigger or aggravate cancer and emphysema. For people who live in the most polluted cities, smog levels can be life-threatening.

Asthma, a chronic inflammation of lung tissues making breathing difficult, is one of the main health concerns associated with increased levels of smog. According to the American Lung Association, more than 26.8 million Americans suffer from asthma, and 14 of them die every day, a rate three times greater than 20 years ago.[13] Smog acts as an irritant to the lung tissue of both humans and animals, causing shortness of breath, wheezing, coughing and chest pain. In fact, the U.S. EPA found that between April and October 1997, approximately 450,000 people in 37 eastern states and the District of Columbia suffered substantial shortness of breath and 6 million asthma attacks were reported.[14]

Certain groups, such as children, the elderly and people who work or exercise outside,[15] are especially vulnerable. Children, whose respiratory systems are still developing, breathe more air relative to their body weight and have greater lung surfaces than adults. This, combined with the fact that children spend more time outdoors than adults, means that smog levels have a much more profound effect on their respiratory health. Perhaps this explains why more than one third of the people diagnosed with asthma (at least 8.6 million) are children under 18 years of age.[16] Asthma is also the number one reason kids miss school, according to the American Lung Association.
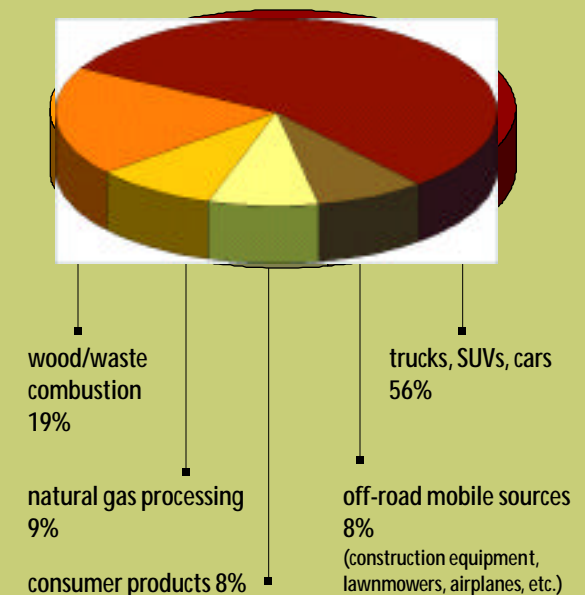
The American Lung Association has also found that minority populations are disproportionately represented in areas with high levels of smog. Approximately 61.3 percent of African American children, 69.2 percent of Hispanic children and 67.7 percent of Asian-American children live in areas that exceed the new smog standard,[17] while only 50.8 percent of white children live in such areas.[18] As a result, these same populations have been disproportionately impacted by asthma, both in terms of occurrence of the disease, as well as hospitalization and mortality rates.

TOXIC AIR POLLUTION AND PUBLIC HEALTH

Smog is not the only air pollutant impacting public health. Air pollution from cars, trucks, SUVs and other vehicles that are regulated under the Clean Air Act includes soot, benzene, arsenic compounds, formaldehyde and lead. These toxic substances are known or probable cancer-causing chemicals to people. In the 1996 National Toxics Inventory, EPA estimates that cars, trucks, SUVs and buses (mobile sources) release about 3 billion pounds of cancer-causing hazardous air pollutants per year. This equates to 11 pounds of pollutants per person per year.[19]

According to the EPA, about one-half of all cancers that are attributed to outdoor air toxics can be traced to the toxics released by mobile sources, such as cars, trucks and SUVs.[20] Highways and roads create a cancer corridor for children. A new study from the Denver metro area shows that children living near streets or highways with just 20,000 cars and trucks per day are more than eight times more likely to develop childhood leukemia.[21] In fact, 56 percent of cancer-causing and hazardous air pollutants come from trucks, SUVs and cars, as the chart below shows.[22]

Trucks, SUVs and cars are the leading sources of cancer-causing and hazardous air pollutants.

wood/waste combustion 19%

trucks, SUVs, cars 56%

natural gas processing 9%

off-road mobile sources 8%
(construction equipment, lawnmowers, airplanes, etc.)

consumer products 8%

Environmental Impacts of Smog

In addition to the public health threats, smog causes a variety of environmental problems. Smog compromises the ability of plants to produce and store food, making them more susceptible to disease, pests and weather. More than $500 million in reduced U.S. crop production can be traced to excessive levels of smog. Damage to trees, grass and other plant life, if extended over long periods of time, can hurt entire ecosystems.

Sprawl Forces People to Drive Farther Creating More Smog

Given the severe health and environmental problems related to smog, why aren't we reducing smog? One of the main reasons pollution levels are not decreasing (and in some cases are actually increasing) is because more people are driving more miles. Although the Clean Air Act has somewhat reduced the pollution from individual cars for each mile driven, smog remains high because the number of miles people drive has more than doubled.[23]

Why are people driving more? Sprawl. Sprawl and a lack of transportation choices force people to own and drive cars in order to reach most destinations. In communities across America, sprawl—scattered development that increases traffic, saps local resources and destroys open space—is taking a serious toll on our health, our environment and our quality of life.

Sprawl lengthens trips and forces us to drive more often. The average American driver spends 443 hours per year—the equivalent of 55 eight-hour workdays—behind the wheel. Residents of sprawling communities drive three to four times as much as those living in compact, well-planned areas. Adding new lanes and building new roads just makes the problem worse. Studies show that increasing road capacity only leads to more traffic and more sprawl.[28]

As sprawl increases our reliance on cars and driving, it makes our air dirtier and less healthy. In fact, the transportation sector is responsible for the majority of the gases that cause smog—56 percent of the total U.S. emissions of nitrogen oxides (NOx) and 47 percent of the volatile organic compounds (VOCs).[29]

Sprawling areas can consume up to three times as much energy from driving than better planned, more compact cities that offer transportation choices. Between 1980 and 1997, the number of miles people drove in cars, trucks and buses increased an astounding 68 percent[30] while population only increased by 18.7 percent.[31]

POPULATION GROWTH AND SPRAWL? WHAT'S THE CONNECTION?

A number of factors cause sprawl, and the exact mix of reasons varies in every city and region. Poor planning and population growth, however, are two of the more common issues driving sprawl.

In many parts of the Midwest and Northeast, sprawl is largely driven by poor land-use planning, irresponsible development and the movement of people out of the cities and into the suburbs.

Some notable examples of this problem include Detroit, Pittsburgh and Chicago. From 1970 to 1990, Detroit's population shrank by 7 percent, but the amount of land it consumed increased by 28 percent. Pittsburgh's population shrank by 9 percent in the same period while its area increased by 30 percent. Chicago's population increased between 1970 and 1990 by 1 percent; meanwhile, its developed land area grew by 24 percent.[24] In these communities, sprawl is not a function of adding new people in an inefficient manner so much as a redistribution of the existing population to the detriment of both the vanishing countryside and the abandoned city. This problem is fueled by government spending on new roads and infrastructure—such as water and sewer lines and schools—on the city edge while simultaneously failing to invest in the maintenance and upgrade of roads and infrastructure in the existing city center. Poor planning and lack of regional cooperation are at fault.

Metro areas in the South and West are also sprawling for some of the same reasons, but in many of these areas, population growth adds to the other pressures that create sprawl and makes the problem worse.[25] Several prime examples include Nashville, Charlotte and Phoenix. Between 1970 and 1990, Nashville's population grew by 28 percent while its urbanized area grew by 41 percent. Charlotte's population grew by a significant 63 percent during this period while its urbanized area grew by a staggering 129 percent.[26]

By contrast, the population in San Jose, Calif., grew by 40 percent during this period, while its developed land area grew by 22 percent.[27] It turns out that San Jose has been adding population to its downtown. It should be noted that San Jose is investing in the transit system that serves its downtown.

The connection between sprawl and population growth is complex and can vary from community to community. That's why it is critical we plan for development wisely and at the same time promote global population stabilization. The world's population is increasing by approximately 1 billion people every 12 years and the United States is now the world's third most populous country. The Sierra Club is committed to supporting comprehensive family planning education and resources. We must address unsustainable population levels. Otherwise, our best efforts to curb sprawl will fall short.

Smart Growth Provides Solutions

Smart growth provides a range of solutions to the problem of sprawl. Smart growth means planning our communities so that our streets will be safer, our neighborhoods will be nicer places to live, our air and water will be less polluted, and our parks, farms and open space will be protected.

Smart-growth efforts to better connect land use and transportation planning in our nation's communities reduce the amount and distance people drive, thereby reducing pollution. These strategies include planning that revitalizes existing communities, and incentives and investments that improve transit, walking, bicycling, ridesharing and telecommuting. In fact, according to Environmental Defense, together these strategies can provide reductions of 15 to 25 percent in the number of miles people drive, hours of vehicle travel and projected pollution from a sprawl development forecast over the next 20 years.[33]

HOW LAND-USE ACTIVITIES INFLUENCE AIR QUALITY

A number of factors contribute to the connection between land use and transportation. The U.S. EPA, in its recent report, "Improving Air Quality Through Land Use Activities,"[32] identified five characteristics of urban development that influence transportation and hence air quality, as follows:

Efficiency, which refers to how condensed or compact a particular area might be. Compactness decreases pollution from cars and trucks by making it less necessary to drive everywhere, and by making transportation options, such as walking, biking and public transportation, like trains and clean buses, more feasible.

Land-Use Mix, which refers to the mix between housing, jobs, schools and amenities like stores. People who live in convenient neighborhoods, with a good mix of opportunities, tend to drive less and walk more.

Transportation Choice, which refers to frequent, nearby public transit. Focusing development in areas with transit accessibility and revitalizing existing communities around transit stations dramatically reduce the need for automobiles, especially for work-related commutes.

Pedestrian Environment /Urban Design Features, which refers to features of a community that make it pedestrian or bicycle-friendly. Communities that incorporate sidewalks, crosswalks, bike lanes and other desirable features increase walking and decrease car and truck use.

Regional Patterns of Development, which refers to planning for development and the necessary infrastructure between regional areas and focusing development in transit corridors while preserving open spaces elsewhere. Areas that work together to plan for development beyond and between local jurisdictions tend to see lower incidences of urban sprawl.

By focusing development and redevelopment efforts on creating compact, mixed-use, transit-accessible, pedestrian-friendly, and regionally-compatible neighborhoods, communities can see a reduction in air pollution.

TO LEARN MORE:

Sierra Club *www.sierraclub.org/sprawl*

The Surface Transportation Policy Project
www.transact.org

1000 Friends of Oregon *www.friends.org*

The EPA's Guidance on Improving Air Quality Through Land Use Activities
www.epa.gov/otaq/transp/traqsusd.htm

WHERE CAN I LEARN MORE ABOUT OZONE AND TOXIC AIR POLLUTION?

The American Lung Association

www.lungusa.org/air/envozone.html
(fact sheet on ozone)

www.lungusa.org/asthma/ascpedfac99.html
(fact sheet on asthma)

www.lungusa.org/air/children_factsheet99.html
(fact sheet on children and asthma)

The Environmental Protection Agency

www.epa.gov/oar/oaqps/gooduphigh/
(overview of ozone issues)

www.epa.gov/airnow/
(information on national air quality)

www.epa.gov/airnow/health/smog1.html#1
(overview of smog and health issues)

www.epa.gov/otaq/04-ozone.htm
(fact sheet on ozone from the Office of Transportation and Air Quality)

www.epa.gov/children/asthma.htm (children and asthma)

www.epa.gov/otaq/toxics.htm (air toxics)

CHAPTER 2:
Measuring Car and Truck Contribution to Smog

Everyone knows that cars and trucks cause air pollution—but how much? How much car and truck smog is produced per resident in a city? How well are cities doing at reducing smog from their transportation system?

It is important to consider the amount of smog per person because transportation pollution relates directly to population size; more people means more transportation in some form. The per person smog levels allow us to compare pollution reductions achieved by increased transportation choices. On a human scale, this means three people can all drive separate cars the same distance, but if those same three people carpooled, their pollution per person would be reduced.

Keep in mind that while we evaluate the smog contribution from cars and trucks, the overall smog in these cities depends on many factors—sunlight, temperatures, winds and "basin" effects (see sidebar on Los Angeles).

Using EPA's numbers for smog from cars and trucks from reports by the regional air districts for the 50 largest cities, we have graded the car and truck smog in each of those cities.

Grading cities based on smog per person from cars and trucks shows how well (or not) they are reducing pollution from their transportation system. Based on the pounds of smog from cars and trucks per person annually, we used the following grading scale:

0-25 . . . . A
26-50 . . . . B
51-75 C
76-100. . . . . D
101 and up. . . . . . . F

Given the extreme levels of smog in major cities across the country as demonstrated in Chapter 1, grades for the smog from cars and trucks in even the best cities rate only a "C." Smog is out of control in almost all of our major cities,

Smog is out of control in almost all of our major cities, and much of that pollution is coming from cars, trucks and other vehicles.

CITY [7]	GRADE FOR CAR AND TRUCK SMOG*	POUNDS OF SMOG** FROM CARS AND TRUCKS PER PERSON PER YEAR	PERCENT OF SMOG** FROM CARS AND TRUCKS
New York—N. New Jersey, N.Y.-N.J..	C+	54	35.8
Chicago-Gary-Kenosha, Ill.	C	69	30.2
Las Vegas, Nev.	C	57	25.8
Los Angeles-Riverside-Orange County, Calif.	C	65	47.0
Providence (All Rhode Island)	C	65	45.5
San Diego, Calif.	C	69	47.8
San Francisco Bay Area, Calif.	C	65	46.9
Baltimore, Md.	C-	72	38.5
Miami-Fort Lauderdale, Fla.	C-	72	43.7
Phoenix, Ariz.	C-	70	36.3
Sacramento Metro, Calif.	C-	70	52.4
Washington, D.C., Metro	C-	72	38.5
West Palm Beach, Fla.	C-	73	38.4
Denver, Colo.	D+	78	28.3
New Orleans, La.	D+	77	14.1
Philadelphia-Atlantic City-Trenton, Pa.-N.J.	D+	77	35.0
Austin, Texas	D	83	43.0
Boston-Worcester-Lawrence, Mass.	D	82	39.3
Buffalo-Niagara Falls, N.Y.	D	83	35.0
Charlotte-Gastonia, N.C.	D	93	35.0
Dallas-Fort Worth, Texas	D	89	48.5
Hartford (Greater Connecticut)	D	91	46.8
Houston-Galveston-Brazoria, Texas	D	85	23.7
Norfolk-Virginia Beach-Newport News, Va.	D	93	34.4
Pittsburgh-Beaver Valley, Pa.	D	92	35.6
Portland, Ore.	D	93	40.3
Raleigh-Durham-Chapel Hill, N.C.	D	92	40.3
Rochester, N.Y.	D	87	36.7
Salt Lake City, Utah	D	90	34.4
Tampa-St. Petersburg-Clearwater, Fla.	D	88	33.5
Cleveland-Akron-Lorain, Ohio	D-	95	37.1
Detroit-Ann Arbor-Flint, Mich.	D-	94	33.3
Grand Rapids, Mich.	D-	96	27.3
Jacksonville, Fla.	D-	98	32.3
Milwaukee-Racine, Wis.	D-	94	35.8
Minneapolis-St. Paul, Minn.	D-	99	34.1
Orlando, Fla.	D-	95	47.6
San Antonio, Texas	D-	96	42.4
Seattle-Tacoma-Bremerton, Wash.	D-	100	46.1
Atlanta, Ga.	F	129	48.3
Cincinnati-Hamilton, Ohio-Ky.	F	103	29.0
Columbus, Ohio	F	105	41.7
Greensboro—Winston-Salem—High Point, N.C.	F	104	24.7
Indianapolis, Ind.	F	134	48.1
Kansas City, Mo.-Kan.	F	111	35.0
Louisville, Ky.	F	137	32.3
Memphis, Tenn.	F	113	21.4
Nashville, Tenn.	F	113	35.4
Oklahoma City, Okla.	F	137	49.4
Richmond, Va.	F	117	35.3
St. Louis, Mo.	F	107	36.9

* Grading scale (pounds of smog from cars and trucks per person annually):
0-25 A; 26-50 B; 51-75 C; 76-100 D; 101 and up F.

** Smog is measured as pounds of ozone precursor, NOx and VOCs emissions.

HOW CAN LOS ANGELES PUT OUT LESS CAR AND TRUCK SMOG BUT STILL HAVE A PROBLEM?

If the NOx and VOCs emissions are lower in Los Angeles than in some other regions, why does L.A. have the worst smog? In fact, people often credit L.A. with inventing smog.

Ozone, or smog, is created when ultraviolet light from the sun stimulates chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs). These photochemical reactions increase as the concentrations of NOx, VOCs, UV and the air temperature increase. The climatic and topological conditions in L.A. make it a near-perfect candidate for smog. It suffers half the year with hot, dry, stagnant air. Add to that explosive mix mountains to the north, east and south which bottle up light breezes from the ocean. The NOx and VOCs emissions from L.A.'s famous traffic and industry sit there cooking, day after day, building up ever higher levels of ozone as the pollution slowly drifts east. No rain interrupts to wash out the smog.

When smog was shown to have perilous health consequences, Congress gave California the right to require tighter auto-emissions standards than the rest of the country. L.A.'s cars and trucks, and its industry, are now among the cleanest in the nation; yet its pollution remains among the worst. However, other cities in the Sunbelt, while lacking L.A.'s basin and stagnant air, seem intent on challenging its smog-king title.

Many regions in the east, also lacking L.A.'s stagnant air and intense UV, not only have their own pollution to worry about, but also pollution blowing in from cars and trucks and industry in the Midwest and Canada. In fact, pollution transport, as it's called, occurs even in the L.A. basin, where the areas with the highest smog are 40 miles downwind from the highest concentrations of traffic and industry.

and much of that pollution is coming from cars, trucks and other vehicles. While some cities are doing better than others at reducing on-road smog, no one has earned a good grade.

However, it is possible for cities to improve their score and even earn an "A." Offering quality transportation choices, increasing transit ridership, focusing commercial and residential development around transit lines, and at least balancing highway and transit spending would all help decrease smog from cars and trucks. Cities taking these steps could earn a top grade. For example, the Washington, D.C., metro area has a number of projects under consideration that could vastly improve its score. One proposed project—the "Purple Line"—is to build a rail line that would encircle the city, connect existing suburban metro lines and add new stations at employment, retail, college and population centers. Also, transit and smart-growth advocates are working to have future development focused around public transit stops so that transit is both more accessible and more desirable. These types of public transit improvements, in Washington, D.C., and elsewhere, would help cities earn an "A" by reducing smog from cars and trucks per person.

Oklahoma City received an "F" for the amount of smog from cars and trucks per person, at 137 pounds per person per year. The New York City region, on the other hand, did much better, earning a "C" at 54 pounds per person per year.

Some may be surprised by the fact that cities like Los Angeles and Las Vegas—both well known for smog and sprawl—did not fail in this grading. It is important to remember that this is a relative grading, and that, in absolute terms, Los Angeles and Las Vegas have very polluted air. It is also important to remember that UV light, heat, dryness and stagnant air drive up smog levels. Los Angeles, which benefits from the nation's tightest emission standards, is the third lowest generator of smog from cars and trucks per person.

CHAPTER 3:
Public Transit vs. Highways: What Cities are Spending to Improve Our Health

As discussed in the last chapter, our reliance on cars and trucks has led to severe air pollution problems and a significant public health threat, but the good news is that we can do something about it. By investing in public transit choices, we can enhance the quality of life in our communities and ensure that we all breathe cleaner air.

Opportunities to Invest in Transit and Clean Up the Air

In 1991, with the passage of the Intermodal Surface Transportation and Efficiency Act (ISTEA), lawmakers finally made the connection between transportation and air pollution. The Act recognized the strong connection between air pollution and transportation by designating billions of dollars for projects designed to help areas meet the standards for smog and carbon monoxide (the so-called CMAQ or Congestion Mitigation and Air Quality program).
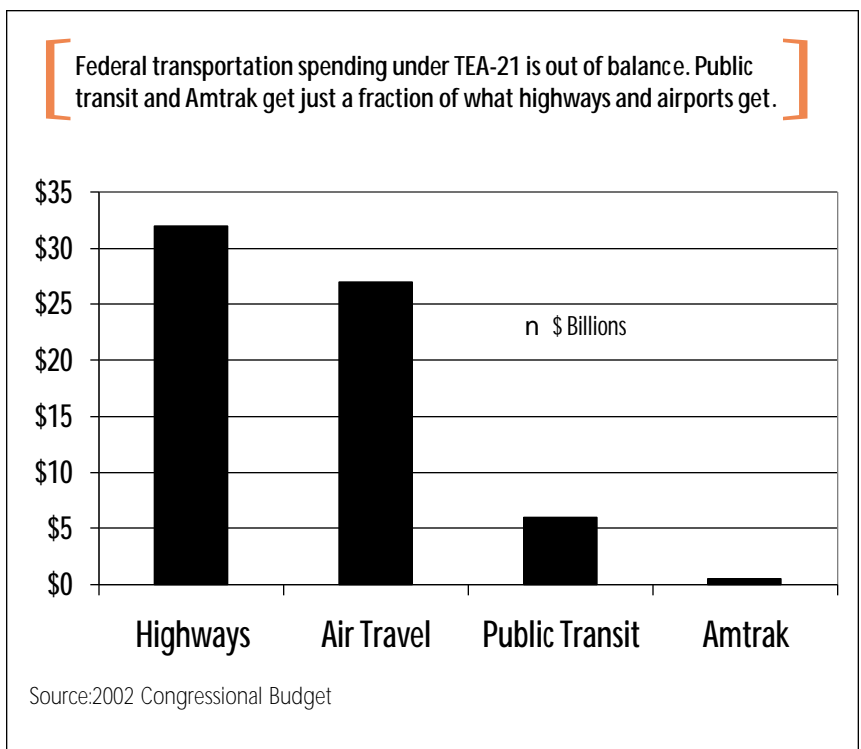
In 1998, Congress reauthorized and strengthened this transportation law by passing TEA-21, the Transportation Equity Act for the 21st Century. TEA-21 built upon the successes of ISTEA and represented a step forward for more-friendly treatment of public transportation choices. In addition to CMAQ, some of the more important features of TEA-21 include the following:

❯ **The Transportation Enhancements program** funds transportation projects that strengthen the cultural, aesthetic or environmental benefits of a given transit program.

❯ **The Transportation and Community System Preservation program** provides grants to communities seeking to develop strategies that improve the efficiency of their transportation system, minimize environmental impacts of transportation and reduce the need for costly public investments in roads and utilities.

❯ **The Transit Capital Investment (New Starts) grants program** funds new rail and bus projects as well as necessary improvements to existing programs.

❯ **The Access to Jobs program** provides discretionary grants to transit service providers to help low income residents get to jobs.

❯ **The Commuter Choice program** made changes to federal tax laws allowing employers to offer a range of commute fringe benefits without fear of tax consequences.

❯ **Continues and expands upon ISTEA's requirements** that bicycling and walking needs be considered as transportation plans are assembled.

The good news is that under TEA-21, funding levels for these programs aimed at less-polluting public transit choices, including the enhancement program, CMAQ and transit, all increased slightly, while spending on new roads declined.[34]

While TEA-21 has made great strides in improving the availability and quality of less-polluting transportation choices, we still have a long way to go to balance the historic discrepancy of expenditures on roads vs. public transit (see chart below). We must continue to increase investments in clean public transit, and offer transportation choices as a way to enhance both quality of life and the quality of the air we breathe.

Federal transportation spending under TEA-21 is out of balance. Public transit and Amtrak get just a fraction of what highways and airports get.

■ $ Billions

	Highways	Air Travel	Public Transit	Amtrak
$ Billions	~$32	~$27	~$6	~$0.5

Source: 2002 Congressional Budget

Investing in Transportation Choices

Giving people more transportation choices can dramatically lower automobile use, reducing air pollution and the accompanying effects on public health. In fact, according to a study done by the Centers for Disease Control and Prevention in Atlanta, providing more transportation choices during the 1996 Olympics reduced traffic by 22 percent, air pollution by 28 percent and asthma attacks by up to 42 percent.[35]

Conversely, limiting transportation choices while disproportionately funding new highway construction leads to more sprawling development, continued environmental degradation and air pollution that threatens public health. By examining the transportation funding in the areas with the most smog from cars and trucks, we can see what these places are doing about the problem.

This grading examines the transportation funding priorities of the states containing all or part of our 50 largest cities, again standardized by applying a per-person calculation. Unfortunately, data on transportation spending by all levels of government is not available at the city level. Because transportation spending is determined by the states, data is kept at that level.

Using state-level data is sufficient to show general trends, and that is what we do in this report. In a few cases, however, the use of state level data produces anomalies that need explanation. For example, in Texas we know that Dallas is investing more in public transit choices, such as Dallas Area Rapid Transit (DART), than Houston. However, because there is not reliable data at the city level, we cannot quantify the difference in transit investments between these two major cities.

Policy changes that would keep transportation spending data at the city level would help planners make better decisions.

This grading analyzes states that contain all or part of one of the 50 largest cities (those used in the first ranking). The information on transit funding comes from the Federal Transit Administration's National Transit Database[36] and the information on highway spending comes from the Federal Highway Administration.[37] The per-person calculations (transit spending per city resident[38] and highway expenditures per person[39]) are based on population numbers from the Census Bureau.[40] All numbers are for 1998. Based on the amount spent per city resident on transit for every $100 dollars spent on highways per person statewide, we used the following grading scale:

$101 and up . . . . . A
$81-100. . . . . B
$61-80 C
$41-60. . . . . D
$0-40 . . . . F

Connection Between Spending on Transportation and Least-Polluted Cities

By comparing pollution from cars and trucks per person to transit spending per person, you'll notice a striking connection. New York state, for example, receives an "A" for its spending on public transit, and is the only state in this grading that spends more money on alternatives than on new roads. At the same time, as shown by the first grading, the New York City metropolitan area received the best grade of all the cities for the lowest amount of smog per person from cars and trucks. Oklahoma, where Oklahoma City had the most smog from cars and trucks per person, spends a paltry $5.80 per person on public transit to every $100 it spends on highway and road construction. This makes Oklahoma one of the lowest graded states in terms of spending on transportation choices vs. roads.

The fact that seven of the 12 cities with the best grades for lowest rates of smog per person from cars and trucks are located in five of the highest graded states for spending on clean transportation choices demonstrates the power of public transit as a tool in combating air pollution.

Buses reduced traffic, air pollution and asthma attacks during the 1996 Olympic Games in Atlanta.
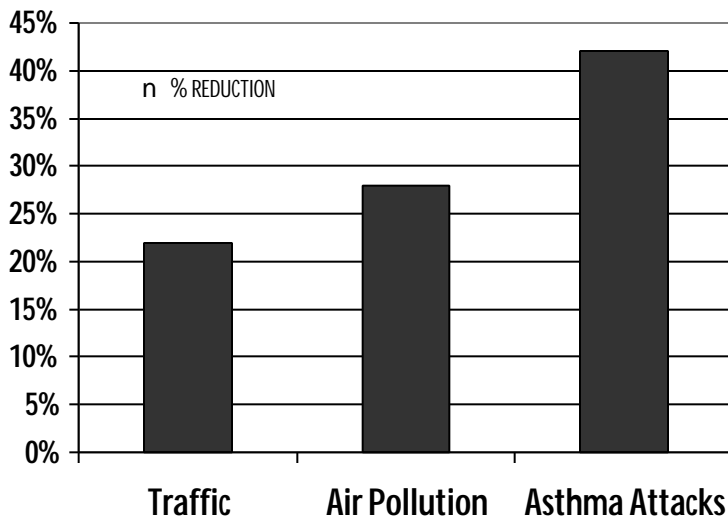
Source: Centers for Disease Control and Prevention[35]

> Giving people more transportation choices can serve to dramatically reduce automobile use, thereby reducing pollution.

STATE	GRADE FOR TRANSIT VS. HIGHWAY EXPENDITURES*	AMOUNT SPENT PER CITY RESIDENT ON TRANSIT FOR EVERY $100 SPENT ON HIGHWAYS PER PERSON**	TRANSIT EXPENDITURE PER CITY RESIDENT	HIGHWAY EXPENDITURE PER PERSON**
New York	A	$128.00	$460.69	$360.97
District of Columbia**	B	$86.60	$232.11	$267.97
Illinois	C	$66.80	$165.97	$248.53
New Jersey	C	$76.50	$183.59	$239.89
California	D	$56.00	$121.53	$217.18
Maryland	D	$41.10	$93.04	$226.15
Massachusetts	D	$53.90	$226.50	$420.29
Oregon	D	$52.70	$176.08	$334.27
Pennsylvania	D	$45.30	$140.50	$309.86
Washington	D	$57.20	$186.27	$325.38
Arizona	F	$13.80	$36.02	$260.68
Arkansas	F	$3.10	$10.19	$330.94
Colorado	F	$25.00	$98.46	$393.43
Connecticut	F	$15.60	$38.85	$249.82
Delaware	F	$15.50	$75.78	$488.78
Florida	F	$16.70	$47.25	$282.65
Georgia	F	$34.40	$93.65	$272.18
Indiana	F	$10.20	$27.49	$268.88
Kansas	F	$2.90	$10.63	$371.21
Kentucky	F	$10.00	$28.12	$282.30
Louisiana	F	$17.70	$44.99	$254.19
Maine	F	$7.20	$26.78	$370.49
Michigan	F	$18.90	$44.46	$235.44
Minnesota	F	$15.80	$69.57	$439.54
Mississippi	F	$2.90	$9.74	$335.55
Missouri	F	$21.00	$66.61	$317.55
Nevada	F	$36.10	$74.01	$205.16
New Hampshire	F	$1.50	$4.86	$330.13
North Carolina	F	$7.80	$22.51	$288.10
Ohio	F	$20.80	$54.25	$260.73
Oklahoma	F	$5.80	$15.31	$262.96
Rhode Island	F	$20.50	$53.24	$259.97
South Carolina	F	$6.10	$11.73	$193.67
Tennessee	F	$10.80	$27.68	$255.46
Texas	F	$28.00	$76.53	$273.21
Utah	F	$23.00	$121.03	$526.75
Virginia	F	$5.10	$20.46	$400.65
West Virginia	F	$6.10	$28.28	$464.45
Wisconsin	F	$15.00	$53.14	$355.23

* Grading scale (Amount spent per city resident on transit for every $100 dollars spent on highways per person):
$0-40 F; $41-60 D; $61-80 C; $81-100 B; $101 and up A.

**This ranking does not include additional highway spending from toll road revenues, which, if included, would raise highway expenditure levels and lower the ratio between transit and highway spending.

Equalizing Transit and Highway Spending Can Reduce Air Pollution

The example set by New York demonstrates that in equalizing spending between public transit and highways, states have a potent tool in the effort to reduce air pollution. Unfortunately, most states still are not using this funding tool as vigorously as they can. With the exception of New York, no states in this report have even equalized funding, and only eight states spend at least 50 percent of the amount of money on public transit as they do on roads.

Even those states that spend at least half as much on transit as on highways are not doing enough. Consider the example of California, which spends $56 per person on public transit for every $100 on highways. While the higher level of spending on transit does help explain the fact that the three California cities (Sacramento, San Francisco and Los Angeles) showed relatively lower levels of smog from cars and trucks per person than cities in other states, this does not alter the fact that these California cities are still quite polluted. For each resident of Los Angeles, approximately 65 pounds of smog comes from cars and trucks annually. These high levels of pollution per person actually helps make Los Angeles the number one overall most smog polluted city in the country. Clearly, California needs to take better advantage of transit investments—a proven tool for reducing smog.

Additionally, in 1998, 27 percent of the funds for transit agencies in Washington state came from the Motor Vehicle Excise Tax (MVET). In 2000, the MVET was repealed, and the state legislature has not come up with a permanent replacement. Consequently, just to keep up with 1998 levels, there's currently a $200 million-a-year hole in transit funding in Washington state.

Texas is another example of a state that needs to do more. While the investments in Dallas' DART system are important and should be continued, other areas of the state, like Houston, are suffering. Houston does compare somewhat favorably to other areas based on their smog per person from cars and trucks. At the same time, it is one of the most smog polluted cities in the country, according to the American Lung Association. Texas can do more to combat this pollution by investing in clean transportation choices.

Funding Choices: The Problem or The Solution

Funding choices can be either the problem or the solution. By investing in clean transportation choices we can enhance the quality of life in our communities and ensure that we all breathe cleaner air. Comparing the highway vs. transit spending of states not only shows us how we have compounded air pollution problems across the country, but also lets us see what needs to be done to fix the problem. States that want to reduce their air pollution and curb sprawl will have to increase funding for public transit, rather than continue to fund more highways. Debates over transportation spending in the coming years should focus on a realignment of transportation spending, at both the federal and state level, which would balance investments in highways and transit.

GETTING ON BOARD:
Annual ridership on the Sacramento Regional Transit District has grown from 14 million passengers in 1987 to more than 26 million passengers in fiscal year 2000.

The more states spend on public transportation, the less car and truck smog is created per person.

CITY [7]	CLEANING THE AIR WITH TRANSPORTATION SPENDING CHOICES*	SMOG FROM CARS AND TRUCKS (PER PERSON)	AMOUNT SPENT ON PUBLIC TRANSIT VS. HIGHWAYS (PER PERSON)
New York-N. New Jersey, N.Y.-N.J.	B+	C+	A (N.Y)
Washington, D.C., Metro	B-	C-	B
Buffalo-Niagara Falls, N.Y.	C+	D	A
Rochester, N.Y.	C+	D	A
Chicago-Gary-Kenosha, Ill.-Ind.	C	C	C (Ill.)
Los Angeles-Riverside-Orange County, Calif.	C-	C	D
San Diego, Calif.	C-	C	D
San Francisco Bay Area, Calif.	C-	C	D
Baltimore, Md.	D+	C-	D
Philadelphia-Atlantic City-Trenton, Pa.-N.J.	D+	D+	D (Pa.) C (N.J.)
Sacramento Metro, Calif.	D+	C-	D
Boston-Worcester-Lawrence, Mass.	D	D	D
Las Vegas, Nev.	D	C	F
Pittsburgh-Beaver Valley, Pa.	D	D	D
Portland, Ore.	D	D	D
Providence (All Rhode Island)	D	C	F
Denver, Colo.	D-	D+	F
Miami-Fort Lauderdale, Fla.	D-	C-	F
Seattle-Tacoma-Bremerton, Wash.	D-	D-	D
Atlanta, Ga.	F	F	F
Austin, Texas	F	D	F
Charlotte-Gastonia, N.C.	F	D	F
Cincinnati-Hamilton, Ohio-Ky.	F	F	F (Ohio) F (Ky.)
Cleveland-Akron-Lorain, Ohio	F	D-	F
Columbus, Ohio	F	F	F
Dallas-Fort Worth, Texas	F	D	F
Detroit-Ann Arbor-Flint, Mich.	F	D-	F
Grand Rapids, Mich.	F	D-	F
Greensboro—Winston-Salem—High Point, N.C.	F	F	F
Hartford (Greater Connecticut)	F	D	F
Houston-Galveston-Brazoria, Texas	F	D	F
Indianapolis, Ind.	F	F	F
Jacksonville, Fla.	F	D-	F
Kansas City, Mo.-Kan.	F	F	F (Mo.) F (Kan.)
Louisville, Ky.	F	F	F
Memphis, Tenn.	F	F	F
Milwaukee-Racine, Wis.	F	D-	F
Minneapolis-St.Paul, Minn.	F	D-	F
Nashville, Tenn.	F	F	F
New Orleans, La.	F	D	F
Norfolk-Virginia Beach-Newport News, Va.	F	D	F
Oklahoma City, Okla.	F	F	F
Orlando, Fla.	F	D-	F
Phoenix, Ariz.	F	D	F
Raleigh-Durham-Chapel Hill, N.C.	F	D	F
Richmond, Va.	F	F	F
St. Louis, Mo.	F	F	F
Salt Lake City, Utah	F	D	F
San Antonio, Texas	F	D-	F
Tampa-St. Petersburg-Clearwater, Fla.	F	D	F
West Palm Beach, Fla.	F	D-	F

*Grading scale to produce a final grade: A—4 points, B—3 points, C—2 points, D—1 point, and F—0 points (with half point increases/decreases for pluses and minuses)

TRIPS AVOIDED, CAR AND TRUCK MILEAGE REDUCED AND POLLUTION AVOIDED

If all of the commuters in New Orleans, San Diego and New York City were to drive to work, there would be more than 2.8 million more cars on the road.

Without transportation choices such as walking, bicycling and transit, there would be:

62,413 more cars on the road in New Orleans.

167,061 more cars on the road in San Diego.

2,610,280 more cars on the road in New York City.

All of these commuters not driving to work greatly reduce the pollution from transportation. If all of the commuters in Chicago, Washington, D.C., San-Francisco-Oakland, Boston and New York City drove to work, it would spew 238,000 more pounds of smog-causing NOx into the air, in just one day. That means 1.19 million pounds of smog-causing NOx would be emitted each week.

Most people still drive to work in cities across the country. In Oklahoma City, Detroit, Memphis, Kansas City and Tampa, far fewer commuters have and use alternatives to driving, so these cities see a much smaller reduction in the amount of smog from car commuters. The meager amount of transit, carpooling, bicycling and walking that now occurs in these cities eliminates only 12,700 pounds of smog-causing NOx pollution each day.

[Most Americans still drive to work; transit is the most common option used by those not driving.]

walking 18%

bicycling 1%

working at home 6%

transit 75%
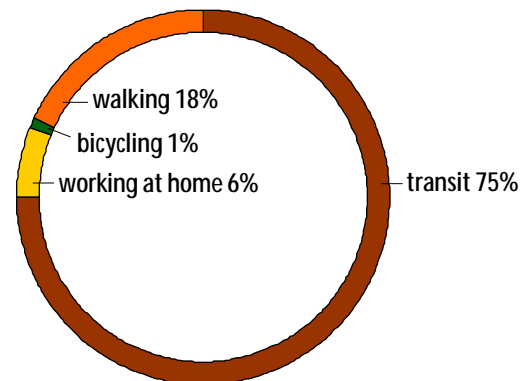
More ways to reduce car and truck smog

In most cities, simply increasing average vehicle occupancy to two persons per car would reduce the number of miles driven and greenhouse gas pollution from cars and trucks by 45 percent.[42]

One Oregon study showed that when more travel options are offered and development allows people to use those options, fewer people use their cars for transport. This results in less car pollution, cutting traffic by 6 percent and traffic delay by 66 percent while increasing transit share to 50 percent and walking and biking to 24 percent. The public transit agency in Portland, LUTRAQ, shows in that total time traveled decreased by two-thirds.[43]

CHAPTER 4:
A Vision for the Future

A number of communities around the country have used public transportation investments to manage their air quality problems. The federal government is even getting into the act with programs like "Commuter Choice." By using successful examples as models and working together, we can achieve dramatic reductions in air pollution—and dramatic increases in public health. The following communities provide examples of successful approaches to reduce car and truck pollution.

PORTLAND, ORE.
Reducing Traffic and Parking Spaces With Land Use Changes and Public Transportation

A citizen-led revolt in the 1970s led to a decision to reject a new highway (the Mt. Hood Freeway) and, instead, turn to land-use changes and public transit options to meet increasing travel needs. Efforts to defeat a "bypass" project in the 1980s and 1990s helped Portland build upon its smart growth principles through the LUTRAQ program (making the Land Use, Transportation and Air Quality connection). LUTRAQ represented a revolutionary new approach to the land-use/transportation connection. The citizen groups involved in the project managed to demonstrate that their land-use alternative to building a new bypass would actually generate 10 percent less in congestion levels and a dramatic decrease in car and truck miles traveled.[44]

Now Portland is a model of smart development and community livability—all without new highways or increased parking spaces. In fact, Portland emphasizes transit, bicycle and pedestrian access ahead of parking downtown. However, residents should not feel a parking "pinch," as most new development zones are placed near existing or future transit stations. The city's transportation plans specifically state that growth in access to these areas is expected to be met through transit, walking and bicycling.

The ability to limit parking and reduce the amount people drive is due in large part to the city's MAX system, a 33-mile light rail system that connects downtown Portland with outlying areas. Bus routes feed in to the light rail system. Combined, bus and transit ridership has grown 12 straight years, with more than 265,300 rides per day in fiscal year 2000. Transit ridership increased 51 percent between 1990 and 1999, while the number of miles people drove increased only 39 percent, making it one of the only regions in the country where transit growth outpaced growth in vehicle miles driven. Perhaps that explains why Portland's air quality has consistently improved over the past nine years, plunging from 11 days of code orange or worse in 1990 to only two in 1999.[45] In addition, NOx and VOCs emissions from automobiles alone decreased dramatically from 1985 to 1999, from 7,982 to 5,391 tons of NOx and from 10,626 to 5,135 tons of VOCs, a more than 50 percent reduction in 14 years.

SALT LAKE CITY, UTAH
Improving Air Quality, Reducing Congestion, and Providing Choice

Even today, communities can turn to transit as a viable option for improving air quality and reducing congestion. Fifteen years after Portland began construction on the MAX system, Salt Lake City is seeing equal success with its TRAX system. TRAX has achieved an impressive daily ridership of nearly 20,000 (41 percent are new to transit) since it opened in December of 1999. But the benefits are not felt only by transit riders. Businesses in the downtown are thriving. On Main Street, old buildings now house new businesses. A parking lot is now a community center with

GRAND OPENING:
Salt Lake City's TRAX system has achieved a daily ridership of nearly 20,000 since it opened in December 1999. More than 40 percent are new to transit.

an ice-skating rink, amphitheater for concerts, and space for events and celebrations. Residents and visitors enjoy walkable streets with plants and street clocks.

Unfortunately, the gains that have been made under TRAX and related smart growth efforts may be destroyed if a proposed 125-mile freeway called the Legacy Highway is built. The highway would ensure sprawling development to the west of the metropolitan area. Smart-growth advocates in the region have promoted a LUTRAQ-type analysis of land-use/transportation choices that includes building on the success of TRAX by creating a robust regional transit system. Citizens of the Salt Lake region appear to be ready for more transit—in the last elections they approved a sales tax increase designated for transit, and have embraced TRAX with open arms.

DALLAS, TEXAS
Reducing Congestion, Improving Productivity and Providing Choice

In August 2000, voters in the 13 cities that make up the service area of the Dallas Area Rapid Transit system (DART) approved a long-term funding program that will build upon DART's existing 20-mile light rail system. This long-term approach is starting with new services to outlying areas that are expected to generate a total of almost 45,000 daily riders. In addition to those extensions, DART hopes to build light rail to Dallas-Fort Worth International

ON A CLEAR DAY:
The air in Dallas is still polluted, though it has improved in recent years. The city's DART system has doubled ridership since 1996 and moves 300,000 passengers per day. In August 2000, voters in the 13-city service area approved a long-term funding program that will expand DART's reach.

airport eight years sooner—in 2010 rather than 2018. The expansion program calls for improved bus services and more high occupancy vehicle lanes.

More than 1,500 bus route miles augment the light-rail system, and the entire system moves about 300,000 people a day across a 700-square-mile service area. This upward trend represents a nearly doubling of ridership since 1996, when the system opened. One of the ways that DART manages these impressive numbers is through innovative approaches such as the convenient employeE-Pass, a low-cost transit pass employers can buy for every employee. Depending on the participating company location and profile, each employeE-Pass costs employers as little as $49 a year, and it allows the employee to ride public transit every day, all year long.[46] While Dallas still has a long way to go to improve its air quality, the area has already seen a reduction in pollution.[47] DART is proving that clean, safe transportation, intelligently planned and professionally executed, is a popular alternative to traffic jams and parking hassles, and can reduce pollution as well.

CHICAGO, ILL. AND CAMPAIGE PLACE, LAS VEGAS
Connections for Community Ownership— Revitalizing Neighborhoods and Helping Businesses Thrive

Adopting smart land use and transportation practices reduces congestion and improves public health. These approaches can also serve to strengthen and revitalize traditionally poor and minority communities.

Connections for Community Ownership, run by the Center for Neighborhood Technology in Chicago, provides business opportunities for minority entrepreneurs and strengthens the commercial districts around transit stops in 14 redeveloping Chicago neighborhoods. Connections acts as an intermediary to link franchisers, minority entrepreneurs and communities with transit-oriented development plans and finance providers, specifically a group of banks and foundations who have set up a subordinated debt fund. By bringing these four interested parties to the table and utilizing the "hidden assets" of inner cities, Connections seeks to boost redevelopment of neighborhood shopping districts while supporting transit use.

Campaige Place, in Las Vegas, seeks to provide assistance to low-income individuals by placing affordable housing right in the core of downtown. The 320 units, designed for individuals making between $9,000 and $18,000 annually, are located in a stylish, secure and well-designed building that is conveniently located near jobs and shops. Residents will be able to walk or take nearby public transportation to

work, hence eliminating the need to drive. In serving both low-income residents and smart-growth principles, Las Vegas has created a win-win initiative.[48]

MILWAUKEE, WIS.
Making the Right Decision to Revitalize Neighborhoods and Enhance Quality of Life

In several areas of the country, improvements have been made in the areas of land-use planning. Milwaukee Mayor John Norquist has been a leader in reusing land for people rather than building more highways. In his recent book, *The Wealth of Cities,* he wrote, "Only in America do we pave our cities with highways." Norquist and other city leaders are working to remove the Park East Freeway, and restore the area to homes and shops, including the new Harley Davidson Museum.[49]

COMMUTER CHOICE LEADERSHIP INITIATIVE—
Improving Productivity, Worker Satisfaction and Quality of Life

The Commuter Choice program promotes employer-provided commuting benefits by giving recognition, resources, tools and information to employers that meet a national standard of excellence in the commuting benefits they offer their employees. Initially, the EPA and federal Department of Transportation worked with a core group of employers (including Intel, Disney, Kaiser Permanente and the City of Fort Worth) to develop the criteria for the national standard of excellence. To date, more than 70 employers have joined the partnership with more than 120,000 employees enjoying commuting benefits that meet the national standard of excellence. The Commuter Choice Leadership Initiative provides incentives for changing the standard American commuting pattern—driving alone to work. The benefits that accrue—especially reduced traffic congestion, improved air quality and reduced fuel consumption—will enhance quality of life in communities across the nation.[50]

Clearing the Air:
Transportation Decisions to Protect Our Health and Communities

Air pollution not only harms our environment by inhibiting plant growth, it also threatens public health with diseases like asthma. Unfortunately, this problem is not going away. Despite the fact that cars are getting somewhat cleaner, smog has actually increased in a number of regions in the past 10 years[51] as the number of miles Americans travel in their cars has increased dramatically.

We know that providing people transportation choices helps clear the air, yet some forecast that by the year 2020, the number of miles driven will triple from 1 trillion miles in 1970 to more than 3 trillion miles. In December 2000, the American Road and Transportation Builders Association (ARTBA) projected a 7 to 10 percent increase in the highway construction market.[52] No matter how clean cars and the fuels they use become, air pollution threatens to increase if people drive more and more.

But there are choices; we as a society do not have to live with air pollution. Our transportation and land-use choices are directly related to our air pollution problems. How we choose to spend on highways or public transportation will have grave impacts for our future. Fortunately, in the coming years we have an opportunity to make the choices necessary to achieve real reductions in air pollution.

BENEFITS OF PUBLIC TRANSPORTATION SPENDING

Clean transportation choices and quality public transit offer many benefits beyond cleaner air to a community. Some of the benefits of public transportation spending include:

Improves air quality
Helps downtown businesses thrive
Reduces traffic congestion
Protects open space and farmland
Revitalizes neighborhoods
Reduces health care costs
Improves productivity and satisfaction of workers
Enhances quality of life
Meets demand for transportation choices

The timing could not be better for promoting less-polluting choices. According to the American Public Transportation Association, America's traveling public is increasingly turning to public transportation. For the second quarter of 2001, the nation's public transportation systems have recorded a 2.9 percent increase in ridership over the same period in 2000. This quarterly increase in ridership builds on last year's year-end total of 9.4 billion trips, the highest peak in annual ridership in more than 40 years. In the past five years, ridership has increased by 21 percent.[53] Clearly, the public is ready to use public transportation—it is up to state and local governments to provide these options.

How can transportation decisions at all levels help meet these goals? By:

[Federal and State Government]

❯ Increasing the amount of money set aside for public transportation.

❯ Reducing the amount of money set aside for road and other car-oriented projects.

❯ Working to equalize funding for highways and clean public transportation projects.

❯ Promoting and supporting planning at the regional and statewide level that combines transportation and land-use planning.

❯ Funding innovative incentive-based programs for encouraging alternative transportation use, such as tax credits.

❯ Supporting public involvement in the transportation and land-use planning process.

[Individuals]

❯ Combine trips when you are running errands.

❯ Walk, bike, use public transit where available, or carpool to work.

❯ Live near your work and near public transportation.

❯ Demand more public transportation choices in your community.

❯ Talk to decision-makers about the need for increased investments in public transit.

By better balancing transportation spending between roads and less-polluting public transit, like high speed rail and clean buses, we can reduce the number of miles people have to drive, provide Americans more transportation choices and better reflect America's priorities on clean air, good health and enhanced quality of life.

ENDNOTES

1   This term "city" refers to a metropolitan statistical area (MSA). All measurements done at the "city" level were calculated using MSA data.

2   This report uses the more common word "smog" instead of the technical term "ground-level ozone." When the report talks about smog from transportation sources, it is referring to the emissions of gases that cause smog (ground level ozone), NOx and VOCs, that come from on-road motor vehicles (cars and trucks). Throughout the report, the use of "smog," "smog pollution" and "smog contribution" refers to the emissions of the gases that cause smog, NOx and VOCs.

3   EPA News Story, August, 2000 *www.epa.gov/epahome/other2_0810.htm*

4   National Air Quality and Emissions Trends Report, 1999 *www.epa.gov/oar/aqtrnd99/*, pages 1-2 executive summary

5   The range of numbers reflects measurements of ozone under the fourth max eight-hour statistic and the second daily max one-hour statistic.

6   Among others—(1) Noland, Robert B., and Lewison L. Lem, in press, "A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the United States and the United Kingdom", Transportation Research D. *(www.cts.cv.ic.ac.uk/staff/wp2-noland.pdf)*. (2) Fulton, Lewis M., Robert B. Noland, Daniel J. Meszler and John V. Thomas, 2000, "A Statistical Analysis of Induced Travel Effects in the U.S. Mid-Atlantic Region", Journal of Transportation and Statistics, 3(1):1-14. *(www.bts.gov/jts/V3N1/fulton.pdf)*

7   This term "city" refers to a metropolitan statistical area (MSA). All measurements done at the "city" level were calculated using MSA data.

8   *www.apta.com*

9   EPA, 1999 National Air Quality and Trends *www.epa.gov/oar/aqtrnd99/html/*

10 The range of numbers reflects measurements of ozone under the fourth max eight-hour statistic and the second daily max one-hour statistic.

11 EPA Fact Sheet on Ozone *www.epa.gov/otaq/04-ozone.htm*

12 EPA News Story, August, 2000 *www.epa.gov/epahome/other2_0810.htm*

13 American Lung Association fact sheet, *www.lungusa.org/asthma/ascpedfac99.html*

14 EPA News Story, August, 2000 *www.epa.gov/epahome/other2_0810.htm*

15 Korrick, Neas, Dockery, Gold, Allen, Hill, Kimball, Rosner, Speizer, "Effects of Ozone and Other Pollutants on the Pulmonary Function of Adult Hikers," Environmental Health Perspectives Volume 106, Number 2, Feb 1998, Conducted 1990-1992, Pinkham Notch New Hampshire, White Mountain National Forest by Harvard School of Public Health, Brigham and Women's Hospital and Appalachian Mountain Club

16 American Lung Association fact sheet, *www.lungusa.org/air/children_factsheet99.html*

17 The new standard is as eight-hour 0.08 ppm national ozone standard.

18 American Lung Association fact sheet, *www.lungusa.org/air/children_factsheet99.html*

19 This figure was generated from the EPA's Air Data site at *www.epa.gov/air/data/ntisumm.html*

20 EPA Fact Sheet on Autos and Air Toxics, *www.epa.gov/otaq/02-toxic.htm*

21 Pearson et al. (2000). "Distance-weighted traffic density in proximity to a home is a risk factor for leukemia and other childhood cancers." Journal of Air and Waste Management Association 50:175-180.

22 1995 National Air pollutant Emission Trend, EPA, 1996

23 Heart, Bennet, and Jennifer Biringer. The Smart Growth—Climate Change Connection. Conservation Law Foundation. November 1, 2000.

24 U.S. Census Bureau.

25 Bartlett, Mageean, O'Connor, "Residential Expansion as a Continental Threat to U.S. Coastal Ecosystems," Population and Environment, Volume 21, Number 5, May 2000.

26 U.S. Census Bureau.

27 U.S. Census Bureau.

28 Among others—(1) Noland, Robert B., and Lewison L. Lem, in press, "A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the United States and the United Kingdom", Transportation Research D. (http://www.cts.cv.ic.ac.uk/staff/wp2-noland.pdf). (2) Fulton, Lewis M., Robert B. Noland, Daniel J. Meszler and John V. Thomas, 2000, "A Statistical Analysis of Induced Travel Effects in the U.S. Mid-Atlantic Region", Journal of Transportation and Statistics, 3(1):1-14. (*www.bts.gov/jts/V3N1/fulton.pdf*)

29 Testimony of Robert D. Brenner, Acting Assistant Administration, U.S. EPA before the Senate Environment and Public Works Committee, August 1, 2000

30 Heart, Bennet, and Jennifer Biringer. The Smart Growth—Climate Change Connection. Conservation Law Foundation. November 1, 2000.

31 *www.census.gov/population/estimates/nation/intfile1-1.txt*

32 *www.epa.gov/otaq/transp/traqsusd.htm*

33 *www.environmentaldefense.org/programs/Transportation/ConformBriefMay.html.* Section titled "Prospects for Reducing Traffic Growth."

34 STPP's TEA-21 Users Guide, *www.tea21.org/guide/guideonline.htm*

35 Friedman,MS,et al. Impact of changes in transportation and commuting behaviors during the 1996 summer Olympic games in Atlanta on air quality and childhood asthma. JAMA 2001;285:897-905.

36 *www.ntdprogram.com* (specifically at *www.ntdprogram.com/NTD/Profiles.nsf/1998%20All?OpenView&Start=99&Count=50*)

37 *www.fhwa.dot.gov* (specifically at *www.fhwa.dot.gov/ohim/hs99/tables/hf2.pdf*)

38 Transit Expenditure Per MSA Resident was calculated by dividing the total amount of money spent by all transit agencies in a given state by the total population of MSAs in the state. The spending numbers came from the National Transit Database. The population numbers came from the Census Bureau. The total amount of money spent by the transit agencies includes the total operating funds and capital funds expended by the agency. These funds come from the local,state and federal levels.

39 Highway Expenditure Per Capita was calculated by dividing the total capital outlay, maintenance, and service expenditures for highways of each state by the total state population. The highway expenditure numbers came from the Federal Highway Administration of the Department of Transportation. They include state, local and federal money. The population numbers came from the Census Bureau.

40 *www.census.gov*

41 This term "city" refers to a metropolitan statistical area (MSA). All measurements done at the "city" level were calculated using MSA data.

42 *www.environmentaldefense.org/pubs/EDF-Letter/1991/Jan/l_habit.html*

43 1000 Friends of Oregon (1998), "Making the Land Use, Transportation, Air Quality Connection," Portland Oregon. *www.friends.org/resources/lut_nutshell.html*

44 1000 Friends of Oregon,"LUTRAQ in a Nutshell," *www.friends.org/resources/pdfs/itsyourc.pdf*

45 USA Today chart of MSAs *www.usatoday.com/news/nation/2001/08/20/aqi/metros.htm*

46 From the DART home page at *www.dart.org*

47 According to PSI measurements, the Dallas area has seen a reduction in pollution,from a maximum level in 1996 of 130, to a maximum level in 2000 of 110.

48 *www.lvnewspapers.com/realestate/REJul-26-Sun-1998/Front/7894742.html*

49 Solving Sprawl, The Sierra Club Rates the States, 1999, page 18, *www.sierraclub.org/sprawl/report99*

50 Testimony of Robert D. Brenner, Acting Assistant Administration,U.S.EPA before the Senate Environment and Public Works Committee, August 1, 2000

51 National Air Quality and Emissions Trends Report, 1999 *www.epa.gov/oar/aqtrnd99/,* pages 1-2 executive summary

52 ARTBA news release *www.artba.org/news/press_releases/archives/2000/12-14-00.htm*

53 *www.apta.com*

APPENDIX: MAKING THE CLEAN AIR GRADE (CITIES IN ALPHABETICAL ORDER)

[The more states spend on public transportation, the less car and truck smog is created per person.]

CITY [7]	CLEANING THE AIR WITH TRANSPORTATION SPENDING CHOICES*	SMOG FROM CARS AND TRUCKS (PER PERSON)	AMOUNT SPENT ON PUBLIC TRANSIT VS. HIGHWAYS (PER PERSON)
Atlanta, Ga.	F	F	F
Austin, Texas	F	D	F
Baltimore, Md.	D+	C-	D
Boston-Worcester-Lawrence, Mass.	D	D	D
Buffalo-Niagara Falls, N.Y.	C+	D	A
Charlotte-Gastonia, N.C.	F	D	F
Chicago-Gary-Kenosha, Ill.-Ind.	C	C	C (Ill.)
Cincinnati-Hamilton, Ohio-Ky.	F	F	F (Ohio) F (Ky.)
Cleveland-Akron-Lorain, Ohio	F	D-	F
Columbus, Ohio	F	F	F
Dallas-Fort Worth, Texas	F	D	F
Denver, Colo.	D-	D+	F
Detroit-Ann Arbor-Flint, Mich.	F	D-	F
Grand Rapids, Mich.	F	D-	F
Greensboro—Winston-Salem—High Point, N.C.	F	F	F
Hartford (Greater Connecticut)	F	D	F
Houston-Galveston-Brazoria, Texas	F	D	F
Indianapolis, Ind.	F	F	F
Jacksonville, Fla.	F	D-	F
Kansas City, Mo.-Kan.	F	F	F (Mo.) F (Kan.)
Las Vegas, Nev.	D	C	F
Los Angeles-Riverside-Orange County, Calif.	C-	C	D
Louisville, Ky.	F	F	F
Memphis, Tenn.	F	F	F
Miami-Fort Lauderdale, Fla.	D-	C-	F
Milwaukee-Racine, Wis.	F	D-	F
Minneapolis-St. Paul, Minn.	F	D-	F
Nashville, Tenn.	F	F	F
New Orleans, La.	F	D	F
New York-N. New Jersey, N.Y.-N.J.	B+	C+	A (N.Y.)
Norfolk-Virginia Beach-Newport News, Va.	F	D	F
Oklahoma City, Okla.	F	F	F
Orlando, Fla.	F	D-	F
Phoenix, Ariz.	F	D	F
Philadelphia-Atlantic City-Trenton, Pa.-N.J.	D+	D+	D (Pa.) C (N.J.)
Pittsburgh-Beaver Valley, Pa.	D	D	D
Portland, Ore.	D	D	D
Providence (All Rhode Island)	D	C	F
Raleigh-Durham-Chapel Hill, N.C.	F	D	F
Richmond, Va.	F	F	F
Rochester, N.Y.	C+	D	A
Sacramento Metro, Calif.	D+	C-	D
St. Louis, Mo.	F	F	F
Salt Lake City, Utah	F	D	F
San Antonio, Texas	F	D-	F
San Diego, Calif.	C-	C	D
San Francisco Bay Area, Calif.	C-	C	D
Seattle-Tacoma-Bremerton, Wash.	D-	D-	D
Tampa-St. Petersburg-Clearwater, Fla.	F	D	F
Washington, D.C., Metro	B-	C-	B
West Palm Beach, Fla.	F	D-	F

*Grading scale to produce a final grade: A—4 points, B—3 points, C—2 points, D—1 point, and F—0 points (with half point increases/decreases for pluses and minuses)

Explore, enjoy and protect the planet.