

The **Blueprint** for Clean Air



Summary Report January 1999

SECTIONS:
Regional Air Quality Council
Blueprint for Clean Air
Success to Date
Remaining Challenges
Sources of Air Pollution
Fine Particulate Matter and the Brown Cloud
Strategies Evaluated
Summary of Blueprint Recommendations
Public Input
Recommended Actions to Improve Air Quality
Strategies Evaluated but not Recommended
Further Research
For More Information

Regional **Air** Quality Council

In 1989, Colorado's Governor, in cooperation with local governments of the area, created the Regional Air Quality Council (RAQC) to serve as the lead air quality planning agency for the six-county Denver-Boulder metro area. Members of our board include local elected officials, business representatives, legislators, environmental groups, transportation agencies, and interested citizens. We are **CHARGED WITH** developing the metro area's plans to **COMPLY** with the Environmental Protection Agency's (EPA) health-based air quality **STANDARDS**. We also are charged with recommending strategies to reduce the metro area's "Brown Cloud," for which a state standard was established in 1990.

The **Blueprint** for Clean Air

After successfully developing plans and programs to meet EPA requirements, the RAQC focused on the development of the metro area's first **COMPREHENSIVE**, long range air quality **PLAN**. Called the Blueprint for Clean Air, the plan evaluated the costs, benefits, and feasibility of strategies to achieve various levels of improved air quality through 2020. Specifically, the Blueprint examined strategies to:

1. Maintain compliance with federal health standards, including the new standards for ozone and fine particulate matter (PM-2.5) issued by EPA in 1997;
2. Reduce the number of days when the state's visibility standard for the metro area is exceeded by 50%, 80%, and 100%; and
3. Achieve no net increase from 1995 levels of particulate (PM-10) emissions from motor vehicles (exhaust and road dust).

The Blueprint for Clean Air recommends several voluntary and local actions that, when combined with current programs and anticipated future federal regulation of motor vehicle emissions, will:

1. Keep the area in compliance with current federal health standards through 2020;
2. Reduce PM-2.5 levels by **20 to 25** percent and emissions of ozone-forming pollutants by **15 to 20** percent, providing a margin of safety against future violations of the new federal health standards for these pollutants;
3. Reduce violations of the state's visibility standard for the metro area by **40 to 50** percent; and
4. Maintain PM-10 emissions from motor vehicles at 1995 regulatory levels.

Economic analysis conducted as part of the Blueprint indicates that the additional cost of the plan's recommended actions will be approximately \$20 million dollars per year over 15 years, which equates to roughly \$**10** per year for **each person** in the metro area. The majority of this cost (\$16 million per year) is associated with reducing emissions from Public Service Company's coal-fired power plants in the metro area. The remaining costs are associated with additional street sand reductions (\$2.5 million per year) and improvements to the diesel inspection and maintenance program (\$1.5 million per year).

The RAQC believes that if citizens, businesses and governments in the metro area take these recommended actions now, they can **RETAIN** local **control** over air quality planning decisions and **AVOID** further federal **mandates** that may come with renewed non-attainment status.

The RAQC found that additional actions evaluated but not recommended as part of the Blueprint would be expensive and would provide limited additional air quality improvements. Given the strategies and technologies currently available, the RAQC was **UNABLE TO** identify any set of local actions that would **eliminate** the region's **visibility problem**, regardless of cost.

Success to Date

After the passage of the federal **Clean Air Act in 1970**, the EPA designated **metro Denver** as a non-attainment area for several federal health-based air quality standards. Over the

years, the region frequently violated the standards for carbon monoxide, ozone, and particulate matter. However, in the early 1990's, air quality improvements resulting from federal, state, and local air pollution control programs gradually began to bring the area into compliance with federal standards. The Denver metro area has **NOT VIOLATED** federal standards **since 1995**.

Assuming ongoing implementation of current or equivalent programs, and further federal regulation of motor vehicle emissions, the Denver metro area should remain in compliance with the federal standards for **carbon monoxide**, **ozone**, and **PM-10** through 2020, even with the significant increases in population and vehicle travel expected during this period.

Another **IMPORTANT** aspect of the region's air quality success story is an improved scientific understanding of our PM-2.5 and visibility problems. This is the result of scientific and technical analysis conducted as part of the Blueprint and other efforts, such as the recently completed Northern Front Range Air Quality Study. These **advancements** provide scientific support for the Blueprint recommendations and lay the foundation for additional research and strategy analysis in the future.

Remaining **Challenges**

Despite this success, the Denver metro area still faces two significant air quality challenges over the next twenty years as the population and number of vehicle miles traveled each day continues to grow.

1. **HEALTH STANDARDS**

In response to scientific evidence that the existing federal standards were not fully protective of human health, in July 1997 the EPA issued **new standards** for fine particulate matter (PM-2.5) and ozone.

The Colorado Air Pollution Control Division (APCD) will begin monitoring PM-2.5 in 1999 to determine metro area concentrations and compare them to the new standard. EPA will not make an official determination regarding the region's PM-2.5 attainment status until 2002, but current data suggests that the area may be close to violating the new standard.

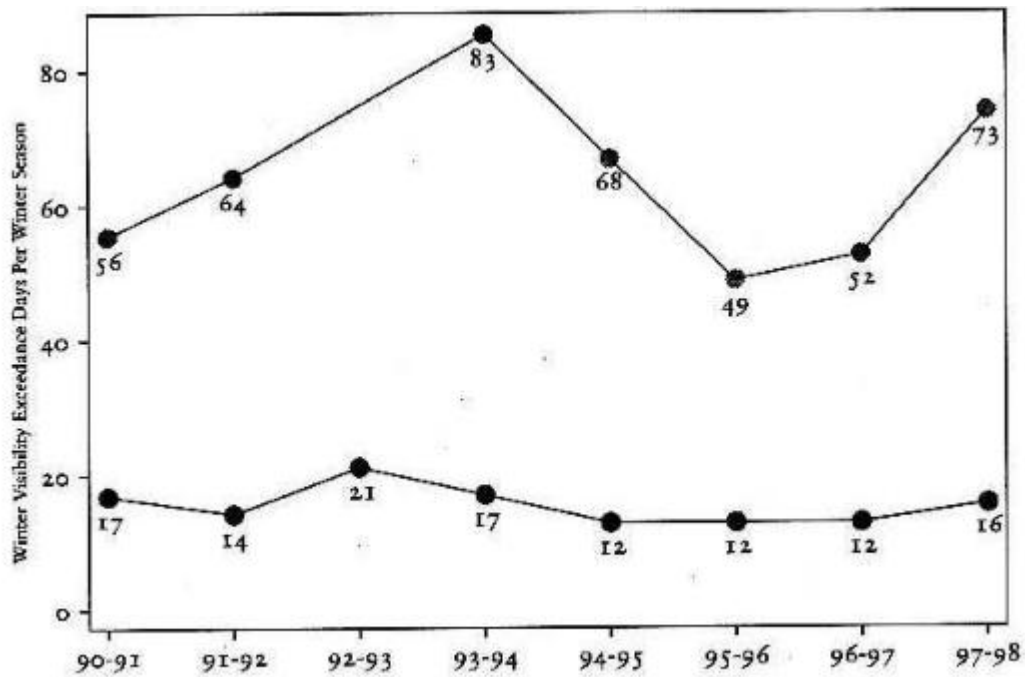
As a result of elevated ozone levels during the summer of 1998, the metro area is currently very close to violating EPA's new ozone standard and once again becoming a non-attainment area for this pollutant. While long-term trends indicate an improvement in ozone levels, the challenge is to reduce emissions in the short-term in order to avoid violations in the next few years.

2. VISIBILITY

Although air quality has improved significantly over the last ten years in terms of federal health standards, the number of exceedances of the state's visibility standard for the metro area has not decreased over this same time period. On average, the metro area violates the state's standard 62 days each winter season (November - March), and approximately 150 days each year.

Because PM-2.5 causes Brown Cloud conditions, these **two challenges** are interrelated. The strategies recommended in this Blueprint for Clean Air will help ensure that the region does not violate the new EPA health standard for PM-2.5 while also reducing the Brown Cloud.

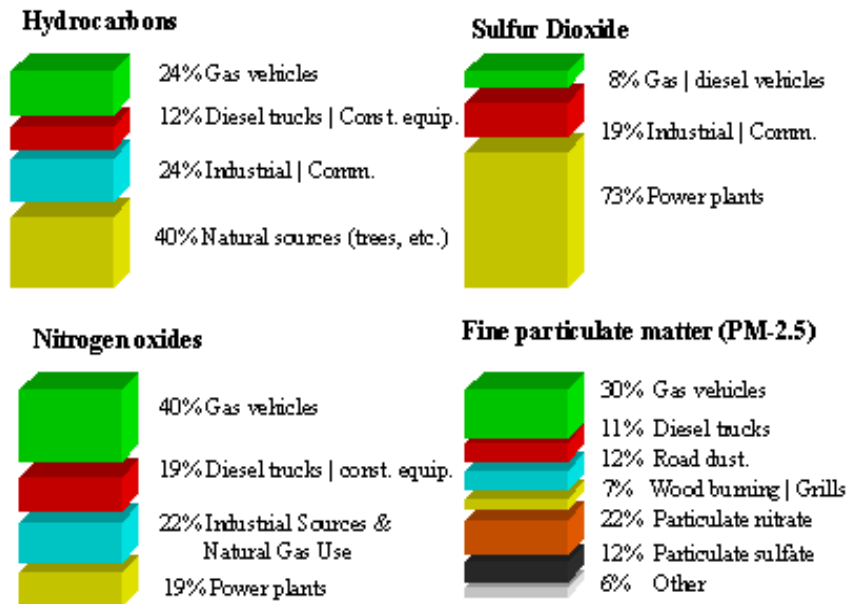
Wintertime Visibility Exceedance Days (NOTE: The top line shows poor visibility days while the lower line indicates extremely poor visibility days.)



Sources of Air Pollution

Motor vehicles are the **LARGEST** source of air pollution along the Front Range. Not only do gasoline and diesel vehicles emit a number of pollutants from their tailpipes, they also kick up street sand and dust from the region's paved and unpaved roadways. These pollutants are responsible for approximately 70 percent of the Brown Cloud and can lead to **violations** of the federal health standards. Coal-fired power plants also are significant contributors to the problem. Other sources include wood burning, restaurant grills, construction equipment, and commercial and industrial sources.

Sources of air pollution



Fine Particulate Matter and the **Brown Cloud**

The air quality **PROBLEM** along the northern Front Range of Colorado is distinctly **regional** in nature. Air pollution from Douglas County to the Wyoming state line collects in the South Platte River Valley and creates the Brown Cloud. In fact, the recently completed Northern Front Range Air Quality Study measured levels of PM-2.5 in rural areas northeast of Greeley that were as high as levels in downtown Denver.

Recognizing the problem's regional nature, the **RAQC** believes it is important to **COORDINATE** air quality planning efforts among Northern Front Range communities as we continue to work on air quality issues in the future.

Strategies Evaluated

With the help of **HUNDREDS OF VOLUNTEERS** who participated in the Blueprint for Clean Air subcommittees, the RAQC evaluated a wide **range** of strategies for reducing air pollution in the metro area. Each subcommittee began with a long list of potential strategies. At the end of Phase I in January 1997, the **subcommittees** narrowed their lists to those strategies which showed the greatest promise and were cost-effective. The costs and benefits of these strategies were then analyzed in detail during Phase II of the Blueprint. At the end of Phase II in July 1998, the RAQC issued its preliminary **RECOMMENDATIONS** for public review.

Public **Input**

In order to obtain broad-based input, the RAQC conducted an intensive [public involvement](#) effort from July through November 1998. The public [INVOLVEMENT](#) effort included:

1. Extensive media coverage of the recommendations
2. A workshop in each metro area county
3. Round table discussions with stakeholder groups
4. A telephone survey of **600** metro area residents, with two follow-up focus groups
5. An hour-long cable TV program broadcast on local access channels in the metro area
6. A web site, including an opportunity for input through an on-line survey
7. Articles in two editions of Public Service Company's bill stuffer newsletter, sent to over 1 million households
8. Presentations to interested organizations

Detailed reports with information on the results of the public involvement efforts can be obtained from the RAQC.

[Support for Improving Air Quality and Implementing the Blueprint](#)

The results of the public involvement effort indicate that the public believes clean air is essential to the quality of life in the metro area and that more needs to be done to improve air quality in the region. Residents not only are concerned with meeting federal health standards, but want to see improvements in the Brown Cloud as well.

The input received indicates support for the recommendations contained in the Blueprint for Clean Air. There is support for reducing vehicle emissions (especially from diesel trucks and smoking cars), reducing the use of street sand, reducing emissions from Public Service Company's coal burning power plants, managing growth, and improving transit.

In addition to expressing overall support for the Blueprint recommendations, the public and various stakeholder groups raised several issues for consideration by the RAQC. These issues are described briefly below, and, to the extent possible, the RAQC has addressed these issues in its final recommendations

1. **GROWTH, LAND USE AND TRANSPORTATION:** The public is concerned about the impacts of growth and indicated support for additional actions to control and mitigate growth, including land use planning. Many people voiced their concern that the region does not have the necessary institutions or structures in place to deal with growth or to mitigate growth related impacts.

The RAQC's preliminary recommendation to "require consistency of local government actions with the Metro Vision 2020 plan in order to receive transportation funds allocated by DRCOG" generated strong opinions from participants in the public meetings and round table discussions. This preliminary recommendation generated both strong support and strong opposition from the public and other interested parties.

Those who expressed concerns with the RAQC's preliminary recommendation pointed out that current local government support for Metro Vision 2020 is based on the premise that implementation will be voluntary. They were concerned that the perception of a mandate for implementation would jeopardize this support. Therefore, they requested that the RAQC change this recommendation to one that encourages compliance with Metro Vision 2020 through the current voluntary approach, combined with some new incentives.

Public input also suggested strong support for improving the region's mass transit system. While the public indicated a willingness to pay for transit improvements, they stated that any proposals for expanding the transit system must be more definite than the 1997 "Guide the Ride" proposal, and must address the need for suburb-to-suburb routes.

1. **OZONE:** Several groups suggested placing more emphasis on ozone in recognition of the region's elevated ozone levels during the summer of 1998, when the area came very close to violating the new ozone standard.
2. **PUBLIC EDUCATION:** A recurring theme throughout the public involvement effort was a call for additional efforts to educate the public about the region's air quality problem and potential solutions. Particular emphasis was placed on the need to communicate with the public about individual actions that can be taken to improve air quality. It was also suggested that the RAQC undertake a concerted public education effort to inform citizens about the specific recommendations contained in the Blueprint.
3. **ALTERNATIVE FUELS, ADVANCED TECHNOLOGY VEHICLES, ENERGY EFFICIENCY AND RENEWABLE RESOURCES:** There is a feeling that more needs to be done in the areas of alternative fuels, advanced technology vehicles, energy conservation, energy efficiency, and renewable sources of energy if we are to achieve significantly cleaner air over the long term.
4. **SMOKING VEHICLES:** The RAQC heard a high level of support for additional action to reduce emissions from smoking vehicles, with a particular emphasis on diesel trucks. This included support for enforcing smoking vehicle laws, modifying the diesel inspection program, and providing incentives to repair or retire dirty vehicles.

Summary of Blueprint for Clean Air Recommendations

1. Reduce uncontrolled sulfur dioxide emissions by 70% and nitrogen oxide emissions by 20% from Public Service Company's coal-fired, metro area power plants.
2. Improve the state's inspection and maintenance program for diesel vehicles.
3. Reduce street sanding, increase the use of alternatives to sand, and/or increase sweeping to avoid increases in mobile source PM-10 emissions.
4. Take actions to reduce vehicle travel and related emissions.
 - Implement the Denver Regional Council of Government's Metro Vision 2020 land use and transportation plan for the metro area.
 - Implement urban design measures to reduce vehicle travel.
5. Establish a Governor's task force to evaluate and make recommendations on the future direction of the oxygenated fuels and light-duty vehicle inspection and maintenance (I/M) programs.
6. Develop a carbon monoxide maintenance plan and redesignation request for the region
7. Increase efforts to reduce emissions from smoking vehicles.
 - Improve the effectiveness of the I/M program to reduce particulate emissions from smoking vehicles and emissions of all pollutants from high-emitting vehicles.
 - Examine the lack of state and local authority and resources to enforce smoking vehicle laws, and pursue actions to address these problems.
 - Develop proposals for incentives to repair or retire smoking vehicles, including diesel vehicles and off-road equipment.
8. Evaluate federal proposals to tighten emission standards for cars and trucks. Advocate for strategies that make sense for the metro area.
9. Take short-term, voluntary actions to guard against violations of the new ozone standard.
10. Implement voluntary and incentive programs to reduce pollution.

Recommended **Actions** to Improve Air Quality

After considering this public input, the RAQC presents the following recommendations as the long-range air quality plan for the metro area. These strategies are recommended because they are the most cost-effective and feasible of all the options considered. While this plan will not eliminate the air quality problem in the metro area, the RAQC believes it represents the correct balance — given current options — between further improvements in air quality and imposing additional costs and requirements on individuals and businesses in the region.

1. [Reduce uncontrolled sulfur dioxide \(SO₂\) emissions by 70% and nitrogen oxide \(NO_x\) emissions by 20% from Public Service Company's coal-fired, metro area power plants.](#)

Public Service Company (PSCo) has agreed to reduce its SO₂ and NO_x emissions beyond what is currently required by state or federal regulations, contingent on its ability to recover the costs of these reductions. PSCo's proposal, which was supported by the RAQC and a wide variety of environmental, labor, and industry groups, was approved by the state legislature in 1998. PSCo has finalized a voluntary emission reduction agreement with the Colorado Air Quality Control Commission (AQCC). During the first quarter of 1999, PSCo will seek approval from the Colorado Public Utilities Commission (PUC) to recover the cost of emission controls needed to achieve these reductions.

The RAQC supports these emission reductions and the concept of cost recovery for these controls, which will reduce PM-2.5 levels and improve visibility in the region. The cost of PSCo's voluntary SO₂ and NO_x reductions is estimated at approximately \$16 million per year over 15 years. This program is expected to increase the average residential utility bill by less than one dollar per month.

Next Steps

As appropriate, the RAQC will provide technical analysis and support before the PUC for Public Service Company's voluntary emissions reduction program. If Public Service receives PUC approval, it will install the emission controls and achieve the reductions by 2003.

2. [Improve the state's diesel vehicle inspection and maintenance \(I/M\) program.](#)

Working with the trucking industry, the Colorado Air Pollution Control Division (APCD) and other interested parties, the RAQC will develop improvements to the existing diesel I/M program to reduce particulate matter and nitrogen oxide emissions. Proposed improvements include: 1) incorporating the latest test procedures; and 2) exempting fleets from testing if they implement a maintenance program that ensures vehicles are operating properly and not producing excess emissions.

Changes to the diesel I/M program may result in increased costs of approximately \$1.5 million per year for the trucking industry. These costs would result from the need to purchase new testing equipment and from increased vehicle maintenance. Some of these costs may be offset by greater fuel efficiency, longer vehicle life, and reduced costs for fleets that are exempted from testing requirements. The costs of this program would be spread across the 40,000 diesel trucks registered in the area.

Next Steps

During 1999, the RAQC will work with the trucking industry and APCD to collect additional data and conduct pilot programs with fleets to evaluate the recommended changes to the diesel I/M program. At the end of 1999, the RAQC will forward a specific proposal to the state legislature for its consideration during the 2000 session. Assuming legislative approval of the proposal, the RAQC will pursue regulatory modifications by the AQCC during the second half of 2000. Implementation of program changes is expected early in 2001.

3. Reduce street sanding, increase the use of alternatives to sand, and/or increase sweeping in order to avoid increases in mobile source particulate emissions.

The RAQC recommends that the existing state street sanding regulation be tightened to require that cities and counties in the metro area, as well as CDOT, reduce future emissions from street sand and road dust in order to keep mobile source PM-10 emissions at 1995 regulatory levels. Each entity should have the flexibility to meet this goal with its own combination of management practices, alternative materials and sweeping programs. The RAQC recommends an alternative emission reduction target for the foothills (above 6,000 feet) where it is more difficult to reduce sanding and sweeping is not cost-effective. Also, the overall level of road dust emissions from the foothills is small and does not contribute significantly to PM-10 levels in the urban area.

The cost of this strategy is estimated at up to \$2.5 million per year and would be borne by state, county, and local agencies responsible for street maintenance in the metro area. Annual winter street maintenance budgets for some agencies will need to increase by an average of approximately 10 to 20 percent over the next 20 years in order to meet this goal.

Next Steps

This goal will be achieved by modifying AQCC Regulation 16 and through continued voluntary actions by local governments that exceed regulatory requirements. The RAQC will propose regulatory changes to the AQCC in early 1999. These could be adopted by mid- 1999. Requirements for further reductions would be phased in beginning in 2000, and would be enforceable as a state-only requirement. Once the new regulation is in place, the RAQC will continue to provide ongoing technical assistance to public works officials as they work to achieve the goals set forth.

4. Actions to reduce vehicle travel and related emissions.

Recognizing that motor vehicles are the largest source of air pollution in the metro area, the RAQC is making several recommendations to reduce vehicle travel and related emissions:

a) Implement the Denver Regional Council of Government's Metro Vision 2020 land use and transportation plan for the metro area.

As the agency responsible for regional planning in the metro area, the Denver Regional Council of Governments (DRCOG) has recently updated its long-range transportation and development plans for the metro area. The Metro Vision 2020 plan represents a significant step forward for the region by incorporating an urban growth boundary, urban centers, and open space corridors, and by call for improvements in the region's public transit systems.

The RAQC supports the Metro Vision 2020 plan as important to preserving and improving the region's air quality. Implementing Metro Vision 2020 is a cost-effective approach to improving the region's air quality. It will reduce vehicle travel and related emissions in 2020 by approximately 10%, while significantly reducing the transportation and other infrastructure costs of new development, such as new local streets and utilities (water, sewer, and storm water).

In the spirit of cooperation with DRCOG, and in support of Metro Vision 2020, the RAQC makes several recommendations.

As a first step, local governments should incorporate the urban growth boundary and other appropriate elements of the Metro Vision 2020 plan into their local comprehensive plans.

Second, the RAQC urges DRCOG to adopt whatever incentives are needed to achieve implementation of the agreed upon regional plan.

Further, in order for Metro Vision 2020 to be successfully implemented, the Regional Transportation District (RTD) and the Colorado Department of Transportation must coordinate their project implementation efforts with Metro Vision 2020 and the plans of local governments in the region.

Accordingly, the RAQC urges RTD to adopt Metro Vision 2020 as its long-term vision of the community's future transit system. The RAQC also urges the Colorado Transportation Commission to pursue air quality beneficial projects within its regional transportation plan, and to work to support the community's goals as expressed in Metro Vision 2020.

The RAQC believes that these are all important steps to recognize the links between transportation, land use and air quality.

b) Implement urban design measures to reduce vehicle travel.

In addition to the strategies included in Metro Vision 2020, the RAQC recommends that local governments implement other land use and urban design measures to reduce vehicle travel and related emissions. Specific measures evaluated and recommended by the RAQC include:

- Improve local street continuity
- Increase mixed use development
- Encourage high density development along transit corridors
- Develop site planning requirements to improve pedestrian and bicycle access to new developments

Next Steps

Achieving air quality improvements through transportation and land use strategies is a long- term process in which air quality officials and a wide variety of other policy making bodies must participate. Therefore, the RAQC will work with local governments, DRCOG, and RTD to implement Metro Vision 2020, including advocating for early build-out of the transit elements contained in the plan. The RAQC will also work with local governments to implement the recommended urban design and land use measures in their current planning and development processes.

5. [Establish a Governor's task force to evaluate and make recommendations on the future direction of the oxygenated fuels program and the light-duty vehicle inspection and maintenance program \(currently operated by Envirotest\).](#)

The RAQC recommends a task force to examine the ongoing need for the oxygenated fuels and inspection and maintenance programs in order to: 1) maintain federal air quality standards; 2) show conformity of regional transportation plans with the EPA-approved air quality plans for the area; and 3) evaluate the cost effectiveness of potential alternative programs.

Next Steps

In November 1998, the Governor issued an Executive Order creating the task force. The task force is expected to begin its work in early 1999, with technical support provided by the RAQC, APCD, DRCOG and other parties as appropriate. Task force recommendations are expected by fall 1999 so that they can be factored into the development of a carbon monoxide maintenance plan by July 2000. Changes to the I/M program are expected to take effect upon expiration of the current Envirotest contract on December 31, 2001.

6. Develop a carbon monoxide maintenance plan and redesignation request for the region.

The RAQC will work with APCD, DRCOG, and others to submit a carbon monoxide maintenance plan to the AQCC by no later than July 2000. Once a maintenance plan is completed, the region will be eligible for redesignation by EPA to attainment status for carbon monoxide.

Next Steps

Beginning in January 1999, the RAQC and APCD will begin preparing the technical analysis (emission inventories and modeling) needed for the carbon monoxide maintenance plan. While there are a number of tasks that can be undertaken immediately, the final technical analysis for the maintenance plan must wait until EPA releases its "Mobile 6" emissions model, which is not anticipated until December 1999. It is necessary to use Mobile 6, which was originally scheduled for release in mid-1998, because deficiencies in EPA's current mobile source emissions model could limit the region's policy choices as it considers how to demonstrate long-term compliance with the carbon monoxide standard.

7. Increase efforts to reduce emissions from smoking vehicles.

Smoking vehicles, both cars and trucks, contribute disproportionately to the region's air quality problems. Therefore, the RAQC, in coordination with state and local government, the state legislature, and other interested parties, will:

- a) Work with the task force addressing the future of the region's light-duty inspection and maintenance program to identify opportunities to improve the effectiveness of the program for reducing particulate emissions from smoking vehicles and emissions of all pollutants from high-emitting vehicles;
- b) Examine the lack of state and local authority and resources to enforce smoking vehicle laws (cars and trucks), and pursue actions to address these problems; and
- c) Develop proposals for incentives to repair or retire smoking vehicles, including diesel vehicles and off-road equipment.

Next Steps

Implementing these recommendations will require an ongoing effort by the RAQC, state and local government, the state legislature, and other interested parties. In particular, addressing the smoking vehicle enforcement issue and identifying funds for incentives may require legislative action.

8. Evaluate federal proposals to tighten emission standards for cars and trucks. Advocate for strategies that make sense for the metro area.

Federal regulation of mobile source emissions has been one of the most effective strategies for improving air quality in the metro Denver area, and throughout the nation, even as the number of miles driven each day has increased dramatically over the last thirty years.

EPA currently is considering tighter standards for light-duty cars and sport utility vehicles (Tier II standards), and is scheduled to make a proposal in January 1999. As part of these Tier II standards, EPA may propose low-sulfur gasoline specifications that will impact the metro area. EPA also has ongoing programs to evaluate future emission standards for diesel vehicles and non-road mobile sources.

Next Steps

In order to respond to federal proposals, the RAQC and other stakeholders will evaluate EPA's Tier II proposal, and other federal proposals, and advocate the region's position regarding such proposals at the national level.

9. Take short-term, voluntary actions to guard against violations of the new ozone standard.

The RAQC, in coordination with APCD, will work with public and private sector stakeholders to evaluate voluntary actions that can be taken by the summer of 1999, and beyond, to reduce the likelihood of future ozone violations and the possibility that the area will be redesignated as an ozone non-attainment area under the new federal standard.

Next Steps

The RAQC, along with APCD, has initiated a process that includes examining actions that could be taken by industrial sources, commercial sources, fuel providers, and individuals to reduce emissions of ozone-forming pollutants. Individual action will be encouraged through public education and communication efforts.

As part of this process, the RAQC and APCD will assess the current state of scientific knowledge regarding the region's ozone problem. This information can then be used to inform policy making, and additional efforts can be initiated to improve the data and scientific analysis related to ozone.

10. Implement voluntary and incentive programs to reduce pollution.

The Blueprint for Clean Air emphasizes the role of voluntary and incentive programs to reduce pollution from a variety of sources in the metro area. These include pollution prevention, energy efficiency, renewable energy, and transportation demand management programs (car pooling, transit, biking, etc.).

State legislation passed in 1998 provides new incentives for alternative fuels for motor vehicles (HB 98-1169) and for industrial source reductions (The Environmental Leadership Program, HB 98-1058). The RAQC recognizes the importance of these strategies for long-term air quality improvements and will continue to work with other parties to expand their use as appropriate. In addition to these current programs, the RAQC advocates renewed incentives to reduce emissions from residential wood burning.

Next Steps

Implementation of voluntary and incentive programs to reduce air pollution will be achieved through ongoing efforts of education and advocacy with citizens, governmental bodies, and businesses. A coordinated effort by public and private sector officials will be required to obtain additional funding to implement incentive programs. The PUC, local governments, and businesses should continue to emphasize energy efficiency in the building and transportation sectors, and encourage the use of cost-effective renewable energy where practical.

Blueprint for Clean Air Air Quality Benefits of Recommended Measures

	Summer		Winter						Visibility Exceedance Days per Winter Season	Average Annual Cost (Millions)
	HC	NOx	HC	NOx	SO2	PM-10	CO	PM-2.5		
1995 Base Case (tons/day)	505.7	344.0	336.2	345.7	85.3	93.8	1578.0	39.2	62.0	-
Current Programs	-10%	-3%	-17%	5%	36%	22%	-39%	2%	-6%	-
2020 Base Case (tons/day)	456.0	334.3	278.7	364.1	115.7	114.7	968.8	40.0	58.1	-
Blueprint Strategies (% reductions from 1995)										
Nat. Low Emission Vehicle Stds.	-7%	-9%	-11%	-10%	0	0	-4%	-5%	-18%	-
PSCo Power Plant Reductions	0	-7%	0	-7%	-73%	0	0	-12%	-17%	\$16.0
Diesel Inspection/Maint.	0	0	-1%	0	0	-1%	0	-2%	-4%	\$1.5

Program										
Street Sanding and Cleaning	0	0	0	0	0	-14%	0	-3%	-2%	\$2.5
Urban Design Measures	-1%	-1%	-1%	-2%	0	-3%	-3%	-2%	-3%	-
2020 Blueprint Case										
% Reduction from 1995	-17%	-20%	-30%	-14%	-37%	4%	-45%	-22%	-45%	-
Resulting tons/day in 2020	417.3	274.1	236.0	297.2	63.5	97.6	862.2	30.7	34.3	\$20.0

HC -- Reactive Hydrocarbons
NOx -- Nitrogen Oxides
SO2 -- Sulfur Dioxide
PM-10 -- Particulate Matter < 10 microns
CO -- Carbon Monoxide
PM-2.5 -- Particulate Matter < 2.5 microns

Strategies **Evaluated** But Not Recommended

Based on the recommendations of the Blueprint for Clean Air subcommittees, and analysis showing relatively small additional air quality improvements, high costs, and/or limited public acceptability, the RAQC does not recommend implementation of the following measures that were evaluated as part of the Blueprint for Clean Air.

Transportation Pricing and Mandatory Parking Strategies

The Transportation and Land Use Subcommittee evaluated the transportation pricing and mandatory parking strategies listed below. While these strategies received strong support from environmental groups and others concerned with the increase in vehicle travel, the majority of public input was supportive of the RAQC's recommendation not to pursue these strategies at this time. Many people were concerned that without a regional transit system providing a viable alternative to the automobile, such strategies would be largely punitive and relatively ineffective.

- Tolling highways in the six-county area
- Setting annual vehicle registration fees on miles driven and/or emission levels
- Transferring a portion of auto insurance costs to the price of fuel
- Increasing fuel taxes

- Establishing mandatory surcharges on commuter parking spaces in the region
- Requiring employers to offer their employees cash in lieu of a paid parking space ("parking cash-out")
- Establishing limits on the number of parking spaces associated with commercial developments and office parks.

Industrial Source Controls

The Industrial Sources Subcommittee evaluated options for reducing sulfur dioxide and nitrogen oxide emissions from the two refineries located in Commerce City and from the coal-fired boilers operated by Trigen at the Coors Brewery in Golden.

The subcommittee found that the potential emission reductions from these sources are relatively expensive on a cost-per-ton basis and would have only a small impact on ambient air quality. Therefore, additional controls on these facilities are not being recommended.

Further **Research**

For some strategies, the RAQC felt that further research was needed before a recommendation could be made. Therefore, the RAQC plans to conduct additional research, in cooperation with stakeholders and other interested parties, into the following programs and may make recommendations regarding their implementation in the future.

Low-sulfur, off-road diesel fuel

Off-road fuel specifications could be set at the state level to reduce emissions from construction equipment and other sources. Such specifications may also be the subject of federal regulations at some point in the future.

Natural gas compressor engines

Analysis completed to date indicates that controlling nitrogen oxide (NO_x) emissions from natural gas compressor engines can be done at a low cost-per-ton compared to other industrial source controls. These reductions may provide an additional margin of safety against violations of the PM-2.5 standard.

The RAQC will further investigate the regional air quality benefits of reducing NO_x emissions from natural gas compressor engines along the Northern Front Range, along with options for achieving these reductions through new voluntary or regulatory programs.

For More **Information**

Additional information, reports, and technical documentation related to the Blueprint for Clean Air can be obtained by contacting the RAQC at:

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