

Section I: Introduction

In July of 2006, Denver Mayor John Hickenlooper launched Greenprint Denver, an ambitious sustainability program, at his 3rd annual State of the City address. The Action Agenda he unveiled focused primarily on integrating sustainability as a key principle within City government operations, and further adopted a set of ambitious goals to help the City lead by example over the coming five years. A City and community advisory group, the Mayor's Greenprint Council, was formed prior to his announcement, to support and guide the effort.

Following the release of the Action Agenda, the Mayor's Office received calls and inquiries from citizens and businesses wanting to know how they could support the goals and values represented by Greenprint Denver. In September of 2006, the Mayor's Greenprint Council, working closely with City staff and faculty and students from the University of Colorado at Denver's Urban Sustainable Infrastructure Engineering Project, embarked on an ambitious 7-month planning process to consider how to engage the broader community in Greenprint Denver generally, and specifically how to accomplish the City's commitment under the US Mayors Climate Protection Agreement: **to reduce citywide per capita emissions by 10 percent relative to 1990 levels by 2012.**

Denver's Climate Action Plan follows in the footsteps of cities such as London (UK), Portland (OR), San Francisco (CA), and Seattle (WA), all of which — through aggressive greenhouse gas reduction programs and policies — have seen real greenhouse gas reduction and have also realized significant economic benefits from their greening efforts. This Climate Action Plan should be viewed not only as a greenhouse gas reduction plan, but also as a jobs plan, a children's and community health plan, an energy security plan, as well as a plan for improving Denver's overall quality of life. Greenprint Denver is also providing a model and template for many other cities throughout the state and nation. Mayor Hickenlooper's leadership on this issue is made possible by support from regional mayors, the Denver business community, and Denver's civic and neighborhood groups. Positioning Denver as a sustainability leader nationally will reap both economic and environmental benefits for the future of the City.



Our recommendations will help Denver to . . .

- . . . reduce our energy consumption without sacrificing our quality of life.
- . . . promote new and "clean" businesses that provide high-quality jobs.
- . . . improve our health and well-being.
- . . . eliminate the need for one coal-fired power plant (equivalent to taking 260,000 cars off the road).
- . . . reduce emissions equivalent to over half a million cars off our roads by 2020.

In this report, we address the relevance of global climate change issues to the Denver community, describe the Greenprint Council's planning process, provide an overview of the greenhouse gas inventory developed for the City by scientists at the University of Colorado at Denver, and lay out our priority recommendations to the Mayor for the City to achieve its greenhouse gas reduction goals.

The recommendations in this report focus on reducing or mitigating greenhouse gas emissions. Many scientific projections now assert that, even with an aggressive and successful greenhouse gas reduction program, climates on Earth will be affected by the increase in greenhouse gases that has already occurred. Thus, Denver must also consider approaches to adaptation and mitigation, in order to lessen the adverse impacts of climate change in our region.

Adaptive responses (that is, measures taken that respond to the local effects resulting from global warming) are an important complement to climate action plans. As such, the Greenprint Council commends the Mayor's Million Trees Campaign ("Tree by Tree — The Mile High Million") as an important step in alleviating some of the impacts of global warming. Using trees to shade the City during the heat of the summer and to create cooler micro-climates within the urban environment will help to reduce energy demand and will make Denver a more comfortable place to live. Although beyond the scope of this report, the Greenprint Council recommends that Denver study additional measures to prepare the City for the possible local impacts of climate change.

IMPROVING OUR ENVIRONMENT — TREE BY TREE

TREES HELP TO COMBAT GLOBAL WARMING BY ABSORBING CARBON DIOXIDE (A GREENHOUSE GAS) AS PART OF PHOTOSYNTHESIS. THEY ALSO PROVIDE SHADE, REDUCING THE NEED FOR ENERGY TO BE GENERATED TO COOL STRUCTURES. (ENERGY IS LARGELY DERIVED FROM THE BURNING OF COAL AND NATURAL GAS — WHICH PRODUCES CARBON DIOXIDE).

IN JULY 2006, MAYOR HICKENLOOPER ANNOUNCED AN AMBITIOUS TREE-PLANTING INITIATIVE. THE GOAL OF **TREE BY TREE — THE MILE HIGH MILLION** IS TO PLANT 1 MILLION NEW COLORADO-FRIENDLY TREES IN METRO DENVER BY 2025. THE UNDERLYING GOAL IS MUCH BROADER: SOW THE SEEDS OF A SUSTAINABLE CITY. STUDIES SHOW THAT TREES ALSO YIELD ENVIRONMENTAL AND ECONOMIC BENEFITS, INCLUDING EROSION AND AIR POLLUTION CONTROL, REDUCED NOISE, AND HIGHER PROPERTY VALUES; AND SOCIAL BENEFITS SUCH AS REDUCED CRIME AND HIGHER TEST SCORES. THEY ALSO ADD BEAUTY TO OUR NEIGHBORHOODS.

THE **TREE BY TREE** PROGRAM IS A HIGHLY PARTICIPATORY COMPONENT OF GREENPRINT DENVER. WHILE OTHER ELEMENTS OF GREENPRINT DENVER ARE FOCUSED ON CITY OPERATIONS AND PUBLIC POLICY, **TREE BY TREE** TAKES THE GREENPRINT VISION TO THE STREETS. IT ENGAGES THE ENTIRE COMMUNITY IMMEDIATELY, RESULTING IN SUSTAINABILITY IN ITS BROADEST SENSE — IN SOCIAL, ECONOMIC, AND ENVIRONMENTAL BENEFITS.

Global Challenges and Local Opportunities

There is widespread scientific consensus that societal emissions of greenhouse gases are impacting the Earth's climate system, threatening the productivity and even the survival of our natural and economic systems. Societal emissions of the three dominant greenhouse gases — carbon dioxide (CO₂), methane (CH₄) and nitrogen oxides (NO_x) — come almost entirely from the burning of fossil fuels such as coal, natural gas, gasoline, and diesel. The supply of cheap fossil fuels is on the decline and the United States is highly dependent on vulnerable foreign supplies to meet its demand for fossil fuels. Clean and stable energy supplies are one of the most important challenges to the sustainability of our society.

Adverse public health impacts from the burning of fossil fuels, particularly gasoline and coal, have long been understood and are becoming increasingly evident. Fine particulate matter generated can lodge in the lungs and cause irritation and other pulmonary difficulties. The elderly, the young, and asthmatics are particularly susceptible. Nitrogen oxides and unburned fuels (containing volatile organic compounds or VOCs) combine with sunlight to form ozone which results in ground-level smog — an issue of special concern in Denver's high-altitude environment. Indirect health impacts from climate change are beginning to occur as well. Summer heat waves and extreme weather events are increasing in duration and intensity, leading to distress and fatalities.

As our climate continues to change, we are likely to see disruption of certain sectors of the economy. Scientists forecast dramatic changes in agricultural output due to unpredictable weather patterns and water production, which is also likely to be reflected at the local level, where semi-arid, dry-land farming is a challenge in much of the region. Many winter sports, including the skiing and snowmobiling industries, are dependent upon cold temperatures and adequate snowfall to thrive. With reductions in cold weather and potential disruptions in precipitation, these industries would be negatively impacted. Significant reductions in total snow pack, related river flows and water supply would also have major implications for both growth and tourism statewide.

With a better understanding of the real and potential environmental, economic, public health, and security impacts associated with traditional energy sources, there has been a dramatic increase in recent years in cleaner and more efficient energy sources and technologies. Many of these new industries and programs bring with them exciting new technologies and strong economic growth opportunities. As a leader in both traditional energy sources and emerging technologies, Colorado stands poised to become a leader in the transition from extractive to renewable resources; and Denver to become the nexus of this effort.

Recent news stories suggest there is growing economic activity around this transition:

- New wind energy farms have recently been announced by BP and Florida Power & Light in eastern Colorado.
- Ground has been broken for a major solar electricity generating station developed by Sun Edison in the San Luis Valley.
- Vestas, a major wind energy producer from Denmark, has announced a wind turbine blade manufacturing plant for northern Colorado.
- Biodiesel and ethanol fuels production facilities in the Denver area have seen substantial growth, along with crop producers that support these fuels.
- The number of service providers associated with energy efficiency projects is showing strong growth.
- Markets for recycled materials continue to improve, as do the recycling efforts of residents, businesses, and institutions.
- Local agricultural producers are supporting an emerging “Buy Local” ethic.
- New technologies for clean coal and natural gas are under active development.

Greenprint Council Statement of Values

The recommendations we provide are but a subset of the thousands of ideas and policies available. While our evaluation criteria involved technical, economic, and political considerations, this report represents a consensus belief that **Denver’s approach to climate change must be effective, measurable, and capable of attracting the widest possible public support.**

We recognize that regulations may in some circumstances be necessary; however, a solely regulatory approach to greenhouse gas reduction has typically fallen short of achieving meaningful goals. Rather, we believe the solutions to these issues need to be tightly integrated with market-based incentives, fully engaging of our diverse communities and inspiring to Denver’s citizens and businesses. This will allow our City to reach for the positive economic potential of sustainable change.

Inherent in our deliberations was a desire to establish Denver as a recognized model of civic commitment to sustainability. Meeting this threshold will require bold and substantive leadership. The tough choices around fiscal commitments, policy decisions, and transformative change in municipal practices will not be easy, nor will they occur quickly or without dissent. Yet these issues represent the defining challenge of our times.



With the above in mind, the Greenprint Council agreed on the following goals and guiding principles:

Goals

1. Establish quantitative greenhouse gas emissions goals and committed deadlines.
2. Establish our community as a national leader in sustainability practices.
3. Position Denver’s municipal government to provide leadership by example.

Guiding Principles

1. Think big — the challenges are significant and reaching meaningful goals requires big ideas and a commitment to practical, attainable solutions.
2. Address all aspects of the challenge: supply side, demand side, efficiency gains, and public engagement.
3. Harness the power of the marketplace: solutions should foster a business climate that encourages broad adoption. Regulations should be prudent and reflect extensive input from the voices of economic development.
4. Embrace the opportunity to foster a whole new cycle of innovation and economic development around sustainability and renewable energy.

Greenprint Council Planning Process

Working with staff from the City and faculty and students from the University of Colorado at Denver's Urban Sustainable Infrastructure Engineering Project, the Mayor's Greenprint Council met intensively over a 7-month period to:

- inventory the makeup of Denver's greenhouse gas emissions,
- study the successes and failures of other similar City efforts,
- evaluate a range of proposed actions, and
- develop a set of recommendations to the Mayor.

Over this period, the Mayor's Greenprint Council studied an inventory of sources of greenhouse gas emissions from the major sectors in Denver (transportation, buildings, and materials/waste), and identified a range of potential strategies to reduce emissions. A variety of expert presenters, both local and national, shared best practices learned from other cities to reduce greenhouse gas emissions and ways to engage citizens in sustainability practices. Many of the recommended strategies are based on precedents and effective implementation in other cities and states.

The Mayor's Greenprint Council recognized, early in their deliberations, that any successful strategies required an understanding both of technological tools (better building materials, more efficient lighting, improved transportation options) and effective outreach and engagement strategies (marketing, policy and/or market incentives) to achieve the desired impacts. For every effective technology, an understanding of the "target audience" and effective means of encouraging adoption of the technology is necessary. For example, the business community needs to understand both the adverse economic impacts that could result from continued climate change as well as the costs and benefits that could accrue from the development and implementation of new technologies, including competitive advantages that could be realized through the adoption of sustainable business models.

The recommendations contained in this report represent a mix of voluntary measures, market incentives, and behavior change strategies to achieve our reduction goals. In some instances, the Council determined that public policy mandates were desirable to achieve greenhouse gas reduction targets.

