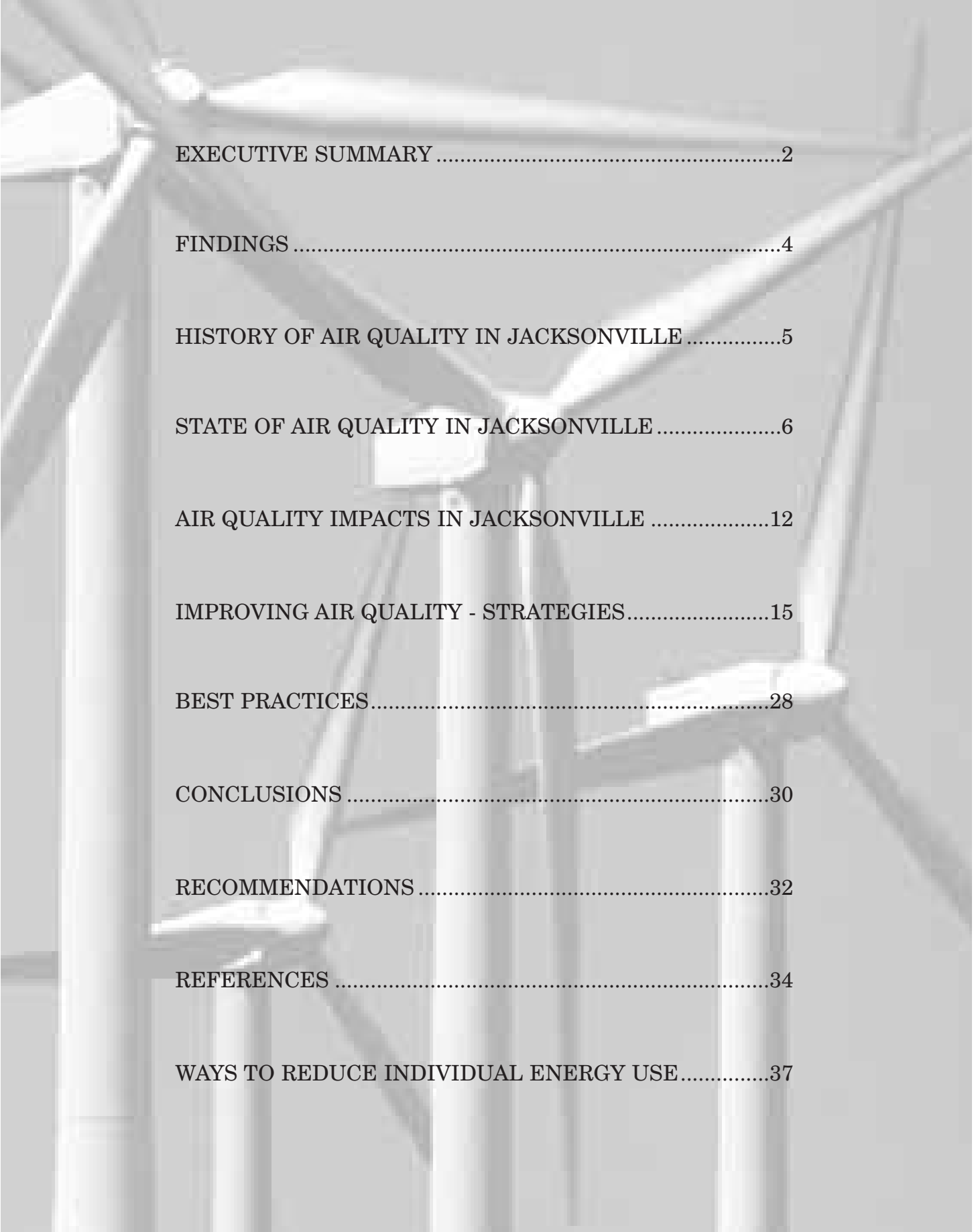




A REPORT TO THE CITIZENS OF NORTHEAST FLORIDA

SUMMER 2007

# TABLE OF CONTENTS

A grayscale background image of a wind turbine, showing its blades and tower structure, positioned behind the table of contents.

EXECUTIVE SUMMARY .....	2
FINDINGS .....	4
HISTORY OF AIR QUALITY IN JACKSONVILLE .....	5
STATE OF AIR QUALITY IN JACKSONVILLE .....	6
AIR QUALITY IMPACTS IN JACKSONVILLE .....	12
IMPROVING AIR QUALITY - STRATEGIES.....	15
BEST PRACTICES.....	28
CONCLUSIONS .....	30
RECOMMENDATIONS .....	32
REFERENCES .....	34
WAYS TO REDUCE INDIVIDUAL ENERGY USE.....	37

## EXECUTIVE SUMMARY

Stop! Take a deep breath. Think about the air you just inhaled. How clean is that air?

Air is necessary for life, and good air is necessary for healthy life for humans, animals, and plants. Air quality affects everyone—regardless of age, gender, race or ethnic group, socio-economic status, education, occupation, or any other distinction. As you read this report, think about the quality of air you breathe now and the quality of the air you want for your children, grandchildren, and yourself in the future.

Historically, Jacksonville has overcome significant air pollution and odor problems. Nonetheless, while Jacksonville meets all currently existing National Ambient Air Quality Standards, the anticipated population growth—doubling the current population by 2030—and the predictable attendant air pollution from increased energy production and vehicle emissions threaten the health, quality of life, natural environment, and economy of Northeast Florida.



Many factors shape air quality, including weather and natural phenomena such as volcanoes and forest fires. Pollution travels around the world; winds transport pollutants in and out of the local environment. Sunlight interacts with natural or man-made chemicals in the air to enhance or inhibit the creation of pollutants. Heat and humidity can intensify the impact of pollution.

Human-made air toxics and pollutants—both regulated and unregulated—from stationary (smokestack) and mobile (vehicle emission) sources damage air quality. Vehicles produce the largest amount of air pollutants in Northeast Florida. Jacksonville relies on non-renewable energy sources for energy production and transportation, primarily coal and fossil fuels that produce CO<sub>2</sub>—a major greenhouse gas implicated in climate change—which is an issue of special concern to Florida because of its low elevation and vulnerability to tropical storms.

Unregulated suburban sprawl with the resultant ever-increasing commute times and the insufficient use of mass transit and its lack of availability on a regional basis lead to more people driving their own cars and more pollutant emissions. Northeast Florida lacks vigorous regional growth management and transportation planning.

While this study, which began with a focus on air quality and air pollutants, does not attempt to address directly the connection between human activities and climate change, it became clear that many of the corrective actions proposed by responsible organizations to reduce carbon dioxide emissions and other toxic pollutants would also result in improved overall air quality, creating a win-win outcome. Furthermore, as the study proceeded, a number of major developments came to light:

- the Supreme Court ruled that the Environmental Protection Agency must regulate carbon dioxide emissions;
- the Florida Legislature created the Florida Energy Commission—with an advisory group on Climate Change—to create a state energy policy;
- Florida Governor Charlie Crist has called on the Legislature to allocate money for research on alternative energy sources, including solar power and fuels such as biodiesel and ethanol; and
- the public has expressed increasing alarm about the potential impact of climate change.

## EXECUTIVE SUMMARY

Jacksonville—with its strong interest in quality of life, its rich and diverse ecosystems, and its progressive and cooperative spirit of communication between citizens, government officials, and industry leaders — has an opportunity to become a national leader for improving air quality through the use of innovative technologies and strategies and strong community support. Jacksonville must meet the challenges and lead the way in creating a vision for a sustainable quality of life for Northeast Florida.

To meet the challenge of a sustainable community, the Air Quality Study Committee made several major recommendations regarding citizen and governmental actions, power generation, mobile emissions, and growth planning. The committee recommends the appointment of a Sustainability Officer to coordinate local efforts to establish goals, objectives, and targets for air quality improvement and long-range sustainability plans for Jacksonville

In regard to energy production, the committee recommends that JEA 1) expand their educational programs to promote energy conservation by individuals and by city agencies; 2) restructure electric rates to promote conservation; 3) increase the percentage of local energy production from renewable sources; and 4) explore alternative energy technologies.

Mobile source emissions are addressed in a number of recommendations, including expansion of JTA mass transit and the provision of various incentives for carpooling, vanpooling, and use of public transportation. Other emission-reduction recommendations are 1) increasing the number of hybrid or alternative fuel vehicles in the fleets of the JTA, the City and its several Authorities, as well as the school bus contractors to Duval County Public Schools; 2) encouraging the Jacksonville Port Authority to work with all stakeholders in decreasing shipment by truck and increasing direct ship-to-train transit; and 3) installing Intelligent Transportation Systems on major roads to diminish vehicle idling time.



Finally, in the hope of developing a regional response to growth, the committee, like other study committees before them, recommended the creation of a regional transportation authority and a regional planning authority with mandates and funding to plan for the growth and transportation needs of the seven counties that form the region.

Northeast Florida must develop visionary leadership to plan for future population growth, while protecting air quality and the natural environment. The ability to enjoy, protect and preserve environmental quality depends to an important degree on the economic well-being of Northeast Florida, and the ability to sustain long-term economic well-being depends on the protection and preservation of its environmental quality.

Additional information and charts are available in an Appendix to this report, available online at [www.jcci.org](http://www.jcci.org) or at JCCI's offices.

## FINDINGS

*Findings represent the information received by the committee. They are derived from published materials, from facts reported by resource people, and from a consensus of the committee's understanding of the opinions of resource people.*

The purpose of this study is to determine how Jacksonville can reduce airborne pollutants to improve air quality and enhance the natural environment, economy, and public health.

### ***Scope of Study***

Jacksonville faced air pollution problems in 1949 severe enough to melt the synthetic clothing that people were wearing. In 1963 vegetation in sections of Jacksonville died off because of air pollutants. In 1978 Jacksonville faced the real possibility of Federal sanctions that would have severely limited regional development because of Jacksonville's non-attainment of Federal clean air standards.

Today Jacksonville enjoys relatively clean air and has remained in compliance with Federal air quality standards. However, the rapid growth that has fueled Jacksonville's economy is putting an ever-increasing burden on our environment and the ability of the natural environment to cleanse and replenish our clean air supply. Since 1997, Jacksonville has developed more than 16 percent of its land area and lost 12 percent of its tree canopy in the woods and wetlands that help cleanse and oxygenate our air.

Within 25 years Jacksonville is expected to be "built out." Resource speakers stated that all developable green spaces will be expended, and the region's population will have doubled. The population of the seven counties of Northeast Florida was 1.3 million in 2005, and estimates for growth by 2030 are 2.7 to 3 million population. This growth will bring with it increasing utility demands, decreasing green space, and vastly increasing motor vehicle traffic that will severely tax the ecosystem and air quality. At the same time, advances in scientific research and air testing technology improve our ability to identify ever smaller concentrations of air hazards resulting in the potential adoption of ever more stringent standards for human exposure. Together these factors raise serious concerns about Jacksonville's future air quality. The same assets that contribute to the quality of life in Northeast Florida and that draw 50 new residents a day to Jacksonville are at risk.

Air quality shapes the environment, the economy, and public health. Public health is greatly affected by the quality of the air we breathe; as air quality worsens, incidents of asthma and death increase, along with the cost of health care for lung-related diseases. As air quality worsens, the natural environment suffers, stressing plant and animal life forms. And, finally, if air quality reaches the point of putting the area into non-attainment of Environmental Protection Standards, Federal highway funding can be frozen, greatly impacting the economy. The Metropolitan Planning Organization indicates that loss of Federal highway funding for the First Coast Region would exceed \$400 million for the years 2010 to 2015, and would exceed \$500 million for the years 2016 to 2020. Atlanta learned that the cost of failing to meet Federal air quality standards is high. Rapid development and congested highways led to Atlanta's failure to meet Federal air quality standards, resulting in the loss of Federal highway funds and the imposition of Federal oversight while Atlanta developed a costly air quality recovery plan. This can happen here.

This study examines how Jacksonville can manage airborne pollutants to improve air quality in ways which will enhance the natural environment, the economy, and public health. The study began in response to the air quality impact of exploding population growth in Jacksonville and surrounding areas. The study focuses on ambient or outside air quality and does not address air quality inside homes or other buildings.



The initial focus of this study was on local air quality and air pollutants, beginning with those labeled by the Environmental Protection Agency as pollutants. However, as the study proceeded, a number of major developments have come to light including a Supreme Court decision to require the Federal government to regulate carbon dioxide emissions; a change in Congressional leadership signaling potential legislative actions on the issue; a shift in the U.S. Administration's perspective acknowledging global climate change concerns; the release of two studies—in February 2007, the first part of the Intergovernmental Panel on Climate Change's Fourth Assessment Report complemented by the March 2007 United Nations Scientific Research Society (Sigma Xi)—both of which conclude that human activities are likely contributing to climate change; the State of Florida formed the Florida Energy Commission, with an advisory group on Climate Change, to create a state energy policy; and the increasing public alarm about the impact of climate change. While this study does not attempt to address directly the connection between human activities and climate change, it became clear that many of the corrective actions proposed by responsible organizations to reduce carbon dioxide emissions and other pollutants would also result in improved overall air quality, creating a win-win outcome.

### ***History of Air Quality in Jacksonville***

Air quality was not a priority issue for Jacksonville in the years of rapid growth following World War II. Jacksonville's natural amenities of abundant pine forests, available land, and navigable rivers, combined with a deep water port, rail and roadway infrastructure, and an industry-friendly government, boosted the area's commercial and industrial development. Nonetheless, an early indicator of air quality problems in Jacksonville surfaced in 1949 when an odious mix of sulfurous soot and moist air resulted in a sufficiently acidic compound that ladies' nylon hose dissolved on their legs.



The story of Jacksonville's disintegrating stockings made the New York Times. Dr. W. W. Rogers, City Health Officer for Jacksonville, drew a parallel with a similar but more lethal smog development in Donora, Pennsylvania, where the acidic air seared lungs and caused asthmatic patients to die. While Rogers doubted that the unusual combination of conditions that poisoned the air in Donora would ever occur in Jacksonville, he did offer a caution that is as timely in 2007 as it was in 1949: "[This] ought to point out to people in a congested community to be careful what they turn loose into the air" (New York Times, 17 February 1949).

Dr. Rogers' warning was realized in the early 1960s, when air quality issues in Jacksonville reached crisis conditions. In parts of Arlington and Springfield, plants were dying due to industrial pollution, most likely emitted by local fertilizer manufacturing companies and other industrial facilities. Elsewhere, boiler soot blow-off from ships in the downtown port area was settling on and pitting the paint of automobiles—notably those vehicles driven by judges and attorneys parked at Jacksonville's downtown courthouse. Other parts of the city were equally affected, and the newspapers and public took notice.

This vegetation and soot damage, along with complaints from the legal community, became a significant concern of the public and the government, and led to studies in 1963 to determine the sources of the pollution and to lay the foundation for subsequent legal actions. Over the coming years, Jacksonville would be empowered by the State of Florida to take increasingly aggressive local action to clean up its air. In 1970, the Congress passed the Clean Air Act, a comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources designed to protect public health and the environment. The City of Jacksonville created the Environmental Protection Board in 1970 and empowered it in 1985 to make local decisions and apply local standards more stringent than State or Federal ones or to create standards where State and Federal entities had not established them.

In 1978, Duval County was one of many areas that failed to meet Federal Clean Air Act standards for ozone and fell into nonattainment status. Ozone is considered one of the top two health risk pollutants in the U.S. Nonattainment for Jacksonville required the City and the State to develop plans to attain and maintain the National Air Quality Standards. In 1995, the City had made sufficient progress to be moved into maintenance status, during which time the City and County had to demonstrate that the ozone standard would be met for the following 10 years.

## STATE OF AIR QUALITY IN JACKSONVILLE

### *The Role of Weather in Air Quality*

Understanding how air pollution impacts people locally or globally begins by looking at the role weather plays in moving, mixing, and cleansing the air. Weather affects air quality in simple and complex ways: weather can cause pollution to settle, concentrate, and persist; it can move pollution from one area to another, including around the world; or it can cleanse the air or mix it, reducing pollution concentrations. Weather can also enhance or inhibit the creation of pollutants caused by photochemistry – the interaction of sunlight with natural or man-made chemicals in the air, including water vapor. Finally, weather conditions can intensify the impact of pollution on humans and the environment by adding heat and humidity.



Interaction of weather and pollution is local, regional, and global. Locally, the air environment is impacted by the burning of fossil fuels, power plant emissions, factory smoke stacks, automobiles, trucks and buses burning fossil fuels, wildfires, agricultural byproducts, and photochemical smog. Regionally, weather circulation patterns bring in—or transport out—pollutants such as acid rain, terpenes, factory smoke, fossil fuel exhaust products, and residue from wildfires. Sulfur compounds generated in Jacksonville are detected in Atlanta and beyond, while factory emissions from Birmingham and Mobile can be tracked to Jacksonville.

Pollution travels around the world. Examples are globe-girdling pollutants generated by large volcanic eruptions; Saharan sandstorm dust carried across the Atlantic to the Eastern U.S. (including Florida); acid rain in the Western United States traceable to smoke stack industries in China; and forest fire pollutants from large-scale deforestation in the Amazon basin that travel continents away.

There are significant seasonal differences that impact local, regional, and global air mass and attendant pollutant movement. For the Southeastern U.S. summer weather is impacted primarily by the dominant Atlantic high pressure systems, which are associated with wide-spread pollution outbreaks due to stagnating air masses. In contrast, low pressure systems are seldom associated with such pollution because of the associated air movement. Seasonal differences can also alter dramatically the photochemistry of our local atmosphere.

The good news for Northeast Florida is that local weather systems tend to help clear the air. In winter, winds flowing from the west dominate our weather pattern, while in summer our recurring afternoon thunderstorms serve to both mix and cleanse the air.

## ***Tracking Air Quality in Jacksonville***

Over time, Jacksonville has accrued powerful tools to address local air quality issues, beginning with the Florida Legislature's creation of the Duval Air Improvement Authority in 1965. Then in 1971, shortly after Jacksonville's transition to a consolidated government, the Air Quality Improvement Authority established the Jacksonville Environmental Protection Board (EPB) that has pursued environmental issues, including air quality, vigorously and successfully.

Jacksonville had reason to take aggressive action early on to develop local odor control regulations. Sulfur compounds from forest industries, chemical plants, and other sources had contributed to Jacksonville's unwelcome national reputation as a city that "stinks," which affected the economic growth and tourist potential of the city. The unpleasant odor also represented more than a mere nuisance or quality of life issue; it signaled chemicals in the air that could potentially affect health. Following the enactment of Rule Two for Air Pollution Control in 1985, the City, through the authority of the EPB, aggressively pursued the odor-generating sources. While Jacksonville has largely overcome its industrial odor problems, the city remains sensitive to its past reputation; this was demonstrated by the local indignation about a pre-Super Bowl national sports columnist's derogatory comments on local air quality. He wrote, "Jacksonville stinks."

Since 1985, Jacksonville has achieved significant reductions in most of the "criteria pollutant" emissions as designated by the U.S. Environmental Protection Agency (EPA), particularly lead, carbon monoxide, nitrogen, and sulfur dioxides. The two remaining criteria pollutants, ozone and particulate matter, are closely watched, but are within EPA standards. Through its ambient air monitoring program, coordinated with the Air Pollution Source Permitting Program, the City has been effective in managing air pollution issues. As the EPA has modified and tightened standards recently, the City has met them. Duval County was designated in attainment for the new ozone standards in 2004 and for new particulate matter standards, PM<sub>2.5</sub>, in 2005. (PM<sub>2.5</sub> is particulate matter less than 2.5 microns in diameter, or about 1/10,000 of an inch.) In 2006, the Air Quality Index measured 305 days in the "Good" range, up from 275 days in 2005. The number of days that were reported as "Unhealthy for Sensitive Groups" decreased from five in 2005 to one in 2006.

## ***Air Toxics***

The EPA is required to control nearly 190 hazardous air pollutants. As of June 2005, the EPA had issued 96 standards for 174 different types of industrial sources of air toxics ranging from steel mills and chemical plants to oil refineries. In addition, the EPA motor vehicle and fuel emission control programs target air toxics. Nonetheless, accomplishing the regulation of an air toxic can be a lengthy process. Development of recent power plant mercury emission regulations is an instructive example.

The 1990 Clean Air Act outlined the procedure the EPA must follow to set standards to regulate air toxic emissions—including mercury—from power plants, but did not set deadlines for initiating action. Deadlines were finally specified as a result of legal action against the EPA in the early 1990s. The first step was for the EPA to undertake a utility air toxics study to determine whether it was "appropriate and necessary" to regulate power plants under the Clean Air Act, and if so, to issue regulations by November 2000. A series of deadline extensions followed as more data were collected, additional public and industry inputs solicited, and available emission control technologies explored. In March 2005, the EPA issued a two-phase Clean Air Mercury Rule (CAMR) to reduce mercury emissions from power plants by 70 percent by 2018. Within two months, the 2005 CAMR was challenged by industry and environmental groups on various grounds. Meanwhile, the new rule remains in effect.



Jacksonville's air toxics monitoring program began mobile lab monitoring in 1997 and added five stationary sites between 1999 and 2002 to monitor 40 organic pollutants. The mobile laboratory has checked more than 34 locations for air toxics across Jacksonville including industrial sites, downtown locations, public schools, landfills, various JEA sites, hospitals and neighborhood fire stations. No new monitoring sites have been established since 2002, and none are anticipated in the near future. The major focus now is on maintaining the sites currently in place. The cost of operating each site ranges from \$2,000 to \$10,000 per year. Furthermore, at this time the EPA is changing its policy on ambient air monitoring by moving in the direction of maintaining fewer monitoring sites but testing for a wider range of pollutants at each site. Funding for this new monitoring model would be provided largely through State contracts.

Jacksonville's air monitoring program includes testing for criteria pollutants and for air toxics identified by the National Ambient Air Quality Standards. The City of Jacksonville monitors ambient air for criteria pollutants and toxics at 13 locations in Duval County. The goal of site placement is to get a reading of air quality in the area as a whole, not specific hot spots. Testing for localized "hot spots" is viewed by the State and the EPA as a local responsibility.

#### **Monitoring for Air Quality:**

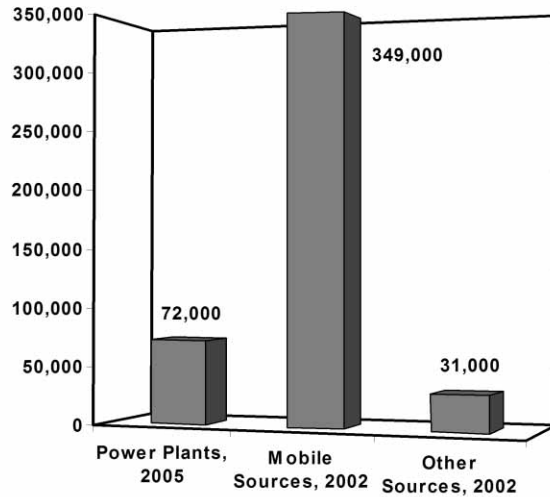
In 2003, Jacksonville began recording high levels of benzene concentrations. Benzene is a cancer-causing chemical associated with increased incidences of leukemia, reproductive abnormalities, blood disorders, as well as other short-term adverse effects. Benzene is monitored, but it is unregulated, and no standards have been set. However, Jacksonville has a higher air reference benzene concentration than the rest of Florida. Benzene is a component of gasoline, but the City is also searching for other origins of benzene which appear to be unrelated to mobile sources.

### ***Criteria Pollutants***

Criteria pollutants, as determined by the EPA in the Clean Air Act of 1970, include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. A review of Jacksonville's 2002 annual emission inventory shows mobile source emissions from cars, trucks, and other vehicles eclipsing stationary and area sources in three of five Criteria Pollutant categories and at similar levels for a fourth pollutant. Mobile sources are generating 32 percent more volatile organic compounds than the other two sources, stationary and area sources, combined; 38 times the amount of carbon monoxide; and almost six times the particulate matter of the other two sources combined. Mobile sources were significantly lower for only one Criteria Pollutant, sulfur dioxide, where stationary and area sources together were 24 times the level of mobile pollution generation. With Jacksonville's projected growth come not only increased energy demands but also increased stress on the transportation infrastructure and, barring significant technological breakthroughs or consumer behavior changes, increased air pollution.

As a result of Jacksonville's failing to meet the EPA's air quality standards, in 1991 Jacksonville was required by the EPA to implement a vehicle emissions testing program. The testing was limited to vehicles registered in Duval County, ignoring the vehicles that either commuted daily into Jacksonville or who passed through on the interstate highway system. Vehicle testing was eliminated by the Florida legislature in 2000 in four counties, including Duval, as a result of improved air quality and mounting public pressure.

## Total Air Pollutants Emitted in Duval County, in Tons per Year



*Sources: Power plant emissions from Annual Operating Reports submitted to the Florida Department of Environmental Protection (FDEP), 2005; Mobile Source Emissions and Other Source Emissions from the FDEP Emission Inventory, 2002, conducted every five years.*

The above table shows the sources of pollutants in Duval County from power plants, mobile sources, and other point sources including industry. The graph omits non-criteria pollutants such as carbon dioxide or mercury.

Between the mid-1970s and 2006, Jacksonville demonstrated significant progress in the reduction of criteria pollutant emissions. These improvements can be credited to the regulation and enforcement of emission standards under the Clean Air Act, as well as anticipatory or self-initiated actions by industrial sites and our local utility, JEA. These improvements were achieved by technological advances, switching to fuels that generated less pollution, and closure of specific industrial sites. These reductions were achieved despite high population growth and an increase in vehicle miles traveled that is almost four times the population growth rate.

### ***Regulation and Oversight***

A number of agencies share in the regulation of air quality. The table on page 10 provides a brief overview of the major Federal, State, regional, and local players in air quality regulation and oversight. Local air pollution regulation involves other agencies as well, such as the Occupational Safety and Health Administration, the Florida Departments of Environmental Protection, Business and Professional Regulation, Forestry, and Health.

Within Florida, significant authority is delegated to what are termed Local Pollution Control Programs, or Local Programs. One such Local Program is the City of Jacksonville which, through a formal agreement with the State of Florida, has authority to oversee implementation of local, State and Federal EPA regulations. Local Programs can implement and enforce local initiatives that exceed State or Federal standards. Jacksonville has used local initiatives to tighten fuel storage safety and containment rules, eliminate ship in-port boiler soot blow-off, create power plant and industrial stack testing teams, establish a noxious odor rule, and implement hazardous air pollutant monitoring.

The hierarchy of agencies in air quality regulation begins with the EPA, followed by state and then local governments. While protocols are in place to delegate significant oversight and enforcement down the chain of command, it is less a transfer of authority than a sharing of it. Each entity retains its authority to react to local environmental issues should it see a need to do so. From the perspective of industry and other point source emitters of air pollutants subject to oversight by these agencies, this system is inconsistent and redundant. Regulatory agencies disagree.

<u>Agency</u>	<u>Authority &amp; Responsibility</u>
Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> <li>• Develops and enforces regulations implementing environmental laws enacted by Congress.</li> <li>• Researches and sets national standards for a variety of environmental programs, and delegates to states the responsibility for issuing permits and for monitoring and enforcing compliance.</li> <li>• Issues sanctions when standards are not met and takes other steps to assist the states and tribes in reaching desired levels of environmental quality.</li> <li>• Offers financial assistance through grants to state environmental programs and to states, non-profits and educational institutions for research to improve the scientific basis for decisions on national environmental issues.</li> <li>• Performs environmental research.</li> <li>• Furthers environmental education.</li> <li>• Sets ambient air quality standards.</li> </ul>
Florida Department of Environmental Protection (DEP)  Division of Air Resource Management (DARM)	<p>State of Florida grants DEP authority to:</p> <ul style="list-style-type: none"> <li>• Establishes and administers air pollution control programs, including Local Pollution Control Programs.</li> <li>• Monitors air quality.</li> <li>• Sets rules for controlling air pollution, issues permits to emission sources, requires reports.</li> <li>• Takes enforcement action against violators of air pollution laws, rules and permits.</li> <li>• Exercises the duties, powers, and responsibilities required of the State under the Federal Clean Air Act.</li> </ul>
Florida Department of Environmental Protection Northeast District	<p>The Division of Air Resource Management is the office responsible for air quality.</p> <ul style="list-style-type: none"> <li>• The largest of DEP's six regional regulatory offices with 20 counties.</li> <li>• Responsible for District compliance with DEP rules.</li> <li>• Responds to environmental questions or requests for support from local governments and the public.</li> </ul>
Duval County Environmental Resource Management Department  Environmental Quality Division (EQD)  Environmental Protection Board (EPB)	<ul style="list-style-type: none"> <li>• Administers Duval's Local Pollution Control Program under authority of the Florida DEP.</li> <li>• Through the Environmental Protection Board, provides enforcement of state and local regulations as well as EPA standards.</li> <li>• "The Board intends that where any locally more stringent provision conflicts with a provision of the Florida Administrative Code adopted by reference, the locally more stringent provision shall apply." (Rule 2: Air Pollution Control, 1985)</li> <li>• Provides public education on environmental issues.</li> <li>• Issues permits for most stationary sources in Duval County.</li> </ul>

## ***Air Pollution Sources***

Air pollution comes from a number of natural and human-made, or anthropogenic, sources. For purposes of tracking, air quality experts often identify them by physical location - stationary sources and mobile sources.

Stationary sources can include both point source and area pollution sites. Point sources are typically fixed sites such as large industries, factories, power plants, paper mills, petroleum refineries and similar locations generally subject to EPA regulation by their characterization as “Major Facilities.” Area sources can be clusters of smaller-size facilities that release lesser quantities of pollutants into the air or large area operations including mining sites, port facilities, rail yards, petroleum tank farms and forest fires. The emissions from individual sources within the area may be relatively small, but collectively their emissions can be of concern—particularly where large numbers of sources are located in heavily populated areas.

Mobile source pollutants are those emitted from highway vehicles and non-or off-road equipment. The non-or off-road mobile sources encompass a wide variety of internal combustion or turbine engines not associated with highway vehicles. These range from aircraft, locomotives, and ships to lawn mowers, recreational boats, and heavy construction equipment.

Power generation is a significant source of pollution because more than 70 percent of electricity is generated in the U.S. from the burning of fossil fuels. The United States has more than 5,000 electric plants using the following fuel sources:

<b>Fuel Source</b>	<b>Percentage of electricity generated in U.S. by each source:</b>
Coal	50 %
Nuclear	20 %
Natural Gas	18 %
Hydroelectric	7 %
Petroleum/Diesel	3 %
Renewable Energy	2 %

Coal accounts for half of the electrical generation fuel used in the U.S. because it is cheap, plentiful, and efficient. The U.S. burns 1.1 billion tons a year. (China burns more than 2 billion tons annually.) It is estimated that 300 to 600 years of coal reserves remain. However, coal is dirty. Burning coal results in the release of nitrous oxides, sulfur oxides, particulate matter, hazardous air toxics, and carbon dioxide, a greenhouse gas. It also results in a significant release of mercury into the atmosphere.

Energy and transportation industry experts point out there are natural sources of pollutants that cannot be ignored. While forests and wetlands help create oxygen and cleanse the atmosphere through photosynthesis and absorption of some chemical and particle pollutants, plants and animals are also sources of harmful volatile organic compounds, plus methane and carbon dioxide, both greenhouse gases. The EPA estimates 60 percent of global methane levels are derived from human activity. The three largest contributors of methane are farming, including ruminant digestive processes and manure management; current waste management practices (landfills account for 25 percent); and natural gas systems. While methane makes up only about eight percent of all emissions, it is 20 times more efficient than carbon dioxide at trapping heat in the atmosphere.

## AIR QUALITY IMPACTS IN JACKSONVILLE

Jacksonville enjoys a unique natural environment with expansive waterways, marshes and parklands, sandy beaches, and a mild climate. It also has heavy industries, large construction operations, chemical plants, small refineries, and among Florida's busiest roadways in terms of per capita vehicle miles traveled. These human activities of daily life add chemicals and particulate matter into the air we breathe and atmosphere surrounding us. These pollutants can obscure the skies with haze or smog, irritate skin and eyes, and penetrate lungs where they can enter the blood stream or settle into lung tissue. Once pollutants enter the body, the results can range from discomfort to permanent mental impairment, cancer, heart attacks, strokes, asthma and other lung diseases, and death.

### *Air Quality in Jacksonville*

The American Lung Association produces an annual State of the Air report on over 700 counties in the United States that are subject to EPA monitoring. It assigns A to F or Pass-Fail grades. The 2006 State of the Air report card for Duval County, released in March 2006 for calendar years 2004 and 2005, assigned the following grades:

Pollutant	Grade	Meaning
Ozone	C	3 to 6 unhealthy days over a three year period
Particulate Matter (daily)	A	Zero days with unhealthy levels over a three year period
Particulate Matter (annually)	Pass	Meeting the National Ambient Air Quality Standard

*Source: American Lung Association*

Air quality in Jacksonville is also affected by various toxic air pollutants released into the atmosphere. Currently the EPA has identified nearly 190 Hazardous Air Pollutants (HAP) it must regulate; however, the EPA has not established standards for all those pollutants at present. In fact, the EPA has established standards for six pollutants—carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur oxides. These pollutants are known or suspected to have adverse environmental or health effects, such as birth defects, cancer, reproductive system effects, or other serious health problems.

In February 2006, the EPA released a national assessment of estimated emissions, concentrations, and risks for 177 air toxics. The assessment's purpose was to serve as a tool for state and local agencies to prioritize pollutants, emissions sources, and locations of interest for further investigation. A 2002 Jacksonville report listed the Top 10 HAPs present in our air, as listed in the following table.



## TOP 10 HAZARDOUS AIR POLLUTANTS – JACKSONVILLE 2002

<u>Hazardous Air Pollutant</u>	<u>Source</u>	<u>Health Impacts</u>
Hydrogen chloride	Industrial boilers, power plants & natural sources	Humans exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing air toxics, some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.
Toluene	Gasoline additive & solvents	
Xylene	Industry, autos & solvents	
Methyl ethyl ketone	Solvents	
Perchloroethylene	Dry cleaning & metal degreasing	
Hydrogen fluoride	Glass etching, aluminum fabrication & chemical industry	
Hexane	Cleaning agent & to extract edible oils from vegetable matter	
Methanol	Industrial & natural sources	
Benzene	Burning coal, oil & gasoline	
Methyl chloroform	Solvents & in many commercial products	

Sources: Dr. Kevin Wolfe; Environmental Protection Agency

### ***Human Health***

Pollutants and toxics in our air adversely affect the health of humans, plants, and animals. Current air quality concerns in Jacksonville focus primarily on pollutants related to respiratory distress and diseases and cardiovascular problems.

### ***Respiratory & Pulmonary Diseases***

Asthma, emphysema, and chronic bronchitis have a higher incidence in Jacksonville than the national average and can, in part, be linked to air pollution. Although Jacksonville falls within the acceptable range with respect to air pollutants measured by the EPA, that does not mean that exposure to certain air pollutants and toxics cannot be harmful, particularly to people predisposed to various health problems.

Duval County's asthma-related death rate is double that of Florida's and much higher than the national average. Deaths due to Chronic Obstructive Pulmonary Disease are 30 percent higher in Duval County than in Florida and also above the national average. In 2005, 367 people in Duval County died from chronic lower respiratory diseases, of which 16 died from asthma.

	Age-Adjusted Asthma Related Death Rate	Age-Adjusted Chronic Obstructive Pulmonary Disease Death Rate
Duval County, 2005	2.1	48.9
Florida, 2005	1.0	38.3
U.S., 2004	1.3	41.8

*\*Figures are per 100,000 population. Sources: Florida Department of Health, U.S. Centers for Disease Control.*

Air quality issues in Jacksonville are generally described in the aggregate, but the impact of pollution and hazardous toxics can be very local, impacting specific neighborhoods. These areas are normally the more industrialized parts of the city, higher traffic areas, and near power plants. Because of the wide range of variables, it would be very difficult to project a specific annual cost of local human exposure to air pollution.

### ***Pollutants Affecting Health***

**Ozone:** A primary culprit in asthma and pulmonary disease is ozone (O<sub>3</sub>) occurring at ground levels. While helpful in the upper atmosphere, at ground levels it is hazardous to health. Ozone penetrates deeper into the parts of the lungs that are more vulnerable to injury. Adverse health effects are increased risk of premature death, increased airway reactivity, lung inflammation, coughing, reduced lung function, increased asthma attacks, and increased susceptibility to infection.

In addition to people with asthma, other segments of the population have been identified to be acutely responsive to ozone exposure. Children are generally at risk of higher exposure—and therefore at risk of greater acute responses—because they tend to be more active and spend more time playing outdoors than most adults. Of the EPA's six criteria pollutants, Jacksonville's ground ozone is the only pollutant registering at significantly high levels to approach or exceed the EPA's 8-hour exposure standards. People with respiratory diseases will experience health effects more immediately and at lower ozone levels than other people. Within a few days, the damaged cells are shed and replaced – much like the skin peels after a sunburn. If this type of inflammation occurs repeatedly, lung tissue may become scarred, resulting in permanent loss of lung function.

**Particulate Matter:** Particulate matter (PM) is a second pollutant related to asthma and pulmonary diseases. Particulate matter includes a mixture of solids and liquid droplets and comes in a wide variety of sizes. The smallest can get deep into the lungs causing serious health damage. The health effects of particle pollution are an increased risk of lung cancer, asthma attacks, impeded lung function growth in children, and heart attacks. Those at risk from particle pollution include everyone at risk from ozone, plus people with cardiovascular diseases or diabetes, older adults, and children.

**Sulfur dioxide:** Sulfur dioxide, emitted primarily by power generation plants and other industries, impacts asthmatics who are physically active outdoors. Health effects of sulfur dioxide include wheezing, chest tightness, and shortness of breath. Long-term exposure can cause respiratory illness, alter the lungs' functioning, and aggravate existing cardiovascular disease.

## ***Lung Cancer***

The incidence of lung cancer in Jacksonville has historically been high, and at various times during the 1970s and 1980s, the city was ranked first in the country in rate of lung cancer incidence. However, research done in the Jacksonville area in 2003 did not attribute our lung cancer rates to air pollution; rather, the primary carcinogens identified were from cigarette smoking and a high fat diet. Jacksonville has a much higher smoking rate than the national average.

## ***Other Health Impacts***

Air pollutants present in Jacksonville have other health impacts beyond pulmonary problems.

- Carbon monoxide adversely affects learning ability, vision, and dexterity and affects those with heart disease.
- Lead may cause a range of health effects, from behavioral problems and learning disabilities, to seizures and death. Children six years old and under are most at risk, because their bodies are growing quickly.
- Mercury exposure can harm the brain, heart, kidneys, lungs, and immune system in people of all ages. High levels of mercury compounds in the bloodstream of unborn babies and young children may harm the developing nervous system, making the child less able to think and learn.
- Benzene has been detected in Jacksonville at elevated levels through its air monitoring systems. Short-term inhalation of benzene can cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation. Long-term exposure has caused cancer, various blood disorders, reproductive problems, and leukemia (cancer of the tissues that form white blood cells).

## **IMPROVING AIR QUALITY - STRATEGIES**

Just as air pollution comes from three primary sources – mobile sources (cars and other vehicles), stationary sources (including energy production and industrial sites), and area sources (large area operations including mining sites, port facilities, rail yards, petroleum tank farms and forest fires) – strategies to improve air quality address the same three categories. The strategies can be grouped as follows:

- Control or clean emissions to remove pollutants
- Use alternative fuels or processes that emit fewer pollutants
- Conserve energy



## **STRATEGIES FOR MOBILE SOURCES**

The key strategies to reduce air pollution from mobile sources are effected through emission controls, alternative (non-polluting) fuels, and reduced pollution-generating activity through decreasing the number of vehicle miles driven and increasing the number of fuel efficient vehicles. Driving less (or using less fuel while driving) can be accomplished through changes in personal driving behaviors, use of mass transit or carpooling alternatives, or changing residential and commercial development patterns to decrease the number of miles driven to work, shop, play, and return home.

## ***Emission Controls***

Automobile emissions have been improved primarily through Federal regulations by:

- increasing engine efficiency which increases miles per gallon of gasoline;
- increasing vehicle efficiency by means of light-weight vehicle design; and
- cleaning up tailpipe emissions through technologies such as eliminating lead from gasoline, requiring catalytic converters, and recalculating exhaust gases.



These efforts have been credited with nearly all the reductions in airborne pollutants from mobile sources in Duval County. While further increasing the efficiency of U. S. vehicles from 20 to 33 miles per gallon would eliminate our need for Middle East petroleum imports and decrease mobile emissions, moves to tighten the EPA fuel efficiency requirements have so far been met with strong resistance from both the auto industry and consumers. As this report was being written, both houses of Congress, the House Energy and Commerce Committee and the Senate Committee on Environment and Public Works, were holding hearings on air quality and climate change, and legislation to mandate increased vehicle gas mileage had been submitted.

Although gasoline automobile engines have been closely regulated for emissions, diesel engines have not undergone similar levels of scrutiny. Nearly everyone is exposed to exhaust from diesel vehicles which contains harmful pollutants in a complex mixture of gases and particulates. Yet diesel engines will likely continue to be vital workhorses of our economy, powering large trucks, buses, farm, railroad, marine and construction equipment. In 2001 the Highway Diesel Rule “2007” was finalized, and the EPA moved forward to require heavy-duty trucks and buses to use cleaner-burning ultra low sulfur diesel fuel, ULSD (See Alternative Fuels on page 17). Engine manufacturers must meet the new standards through a phased-in approach between 2007 and 2010. The problem of diesel truck idling time and the resultant pollution have come to public attention.

In recent years, the U.S. diesel-burning school bus fleet has come under study. Nationally, the average school bus is nine years old and emits nearly twice as much pollution per mile as a tractor-trailer truck. The exhaust from diesel fuel, which powers about 95 percent of the more than 505,000 school buses on U.S. roads today, is linked with asthma, heart disease, cancer, and even premature death. Recent studies have found that pollution can concentrate inside school buses and that contributes significantly to children’s estimated total inhalation of diesel particulate matter. Children are believed to be especially susceptible to air pollution.

Locally, Duval County Public School’s (DCPS) bus contractors operate a relatively young fleet of 1,150 buses that travels 22 million miles a year transporting 51,000 children on twice-daily trips across Duval County. The contracted buses average three years of age; the oldest buses date from 1997, and more than one-third of the fleet is one year old or less. All buses are required to meet Federal, State, and local standards in place at the time the buses are acquired. DCPS conducts bus route planning to place the least polluting buses on the routes on which children have the highest riding-time exposure. The DCPS also implements bus-idling policies to reduce emissions while buses are stopped for a significant length of time.

Other sources of mobile pollutants are off-road gasoline and diesel engines, such as lawn mowers, boats, large earth-movers and construction vehicles. None of these sources of airborne pollutants are currently subject to regulation for emissions in Duval County.

## ***Alternative Fuels***

Beginning in 2007, diesel-powered vehicles are required by Federal regulation to use Ultra Low Sulfur Diesel Fuel, which will reduce sulfur compound and air toxic releases.

The rapid escalation of the cost of gasoline and fossil-fuel diesel has turned U.S. attention to ethanol, biodiesel and other alternative fuels. Ethanol has become an increasingly popular additive to gasoline. However, not all ethanol sources are sustainable. Some require more energy to produce than is generated; algae may be the most promising source in that regard. Fifty percent of General Motor's passenger vehicles manufactured in 2007 will be ethanol-capable, versus only 10 percent previously. The major ethanol challenge is the infrastructure to distribute it and to produce it cost-effectively.

The City of Jacksonville currently operates 5,400 vehicles that consume an average of 6.5 million gallons of fuel annually at a cost of \$15 million. The City supports use of ethanol as an alternative; however, it currently has only one ethanol fueling station, and none are commercially available. Currently, no plans exist for an ethanol plant to be developed by the private sector in Jacksonville.

Use of biodiesel fuel is increasing worldwide as an alternative to petroleum-based diesel. Widely used in Europe, industry experts predict that within the next three to four years the biodiesel business in the U.S. will add \$28 billion and 39,000 new jobs to the economy. The City considers biodiesel as the primary alternative fuel source for its vehicles. Following four years of research, the City launched its fleet management biodiesel project. Motivated by environmental as well as financial concerns, the City committed to building a biodiesel program. Biodiesel was attractive because, first of all, it is cleaner burning. Biodiesel emits 50 percent less carbon monoxide than conventional diesel, 30 percent less particulates, and emits no sulfur oxides. It is also nontoxic to handle, improves engine lubricity (which eliminates the need for lubricating additives), is easily blended and stays blended, and can help eliminate dependence on foreign oil sources.

Biodiesel is very cost-competitive, compared to petroleum-derived diesel. The City of Jacksonville can make its own biodiesel for \$.67 a gallon versus buying petroleum-based diesel at current (February 2007) contract price of \$2.59 per gallon. The preferred source for the raw biodiesel is used cooking oil that is collected from cooperating restaurants in the area. Processing of the used cooking oil is relatively simple and is done at the City's own facility. The end product is Bio-100 (B100), pure biodiesel fuel. A maximum of 2,000 to 3,000 gallons a week can be produced currently, or approximately 150,000 gallons per year. The City's current biodiesel fuel requirement is 500,000 gallons annually, so standard diesel must continue to be purchased. The biodiesel project's "Green City" goal is to eventually generate sufficient biodiesel to meet the fuel demands of the Duval County Public Schools bus fleet, the JTA bus fleet, and JEA's vehicle fleet. This will require generating 1.5 million gallons of biodiesel annually, or it may require acquiring biodiesel from other sources.

## ***Fuel Conservation***

Several different strategies offer opportunities to reduce air pollution by decreasing the amount of miles driven by Jacksonville residents. These include:

- changing personal behaviors in terms of how and how often cars are driven;
- increasing use of mass transit;
- changing development patterns to reduce the length of trips to work, shop, and play in Jacksonville; and
- choosing to purchase locally produced goods to decrease delivery-miles of those purchases.



## Changing Personal Behaviors

Riding bicycles is one of the least polluting transportation alternatives available, though Jacksonville's infrastructure of bike lanes and bike paths was described by resource speakers as both inadequate and dangerous. (Between 2001 and 2005, 15 bicyclists were killed in Duval County, and 1,134 injured, according to the Florida Department of Highway Safety and Motor Vehicles.) But changing personal driving behavior also improves fuel efficiency – driving less aggressively, reducing driving speeds, cutting down on idling, maintaining proper tire pressure, using cruise control when appropriate, and other strategies can increase fuel efficiency by as much as 30 percent.

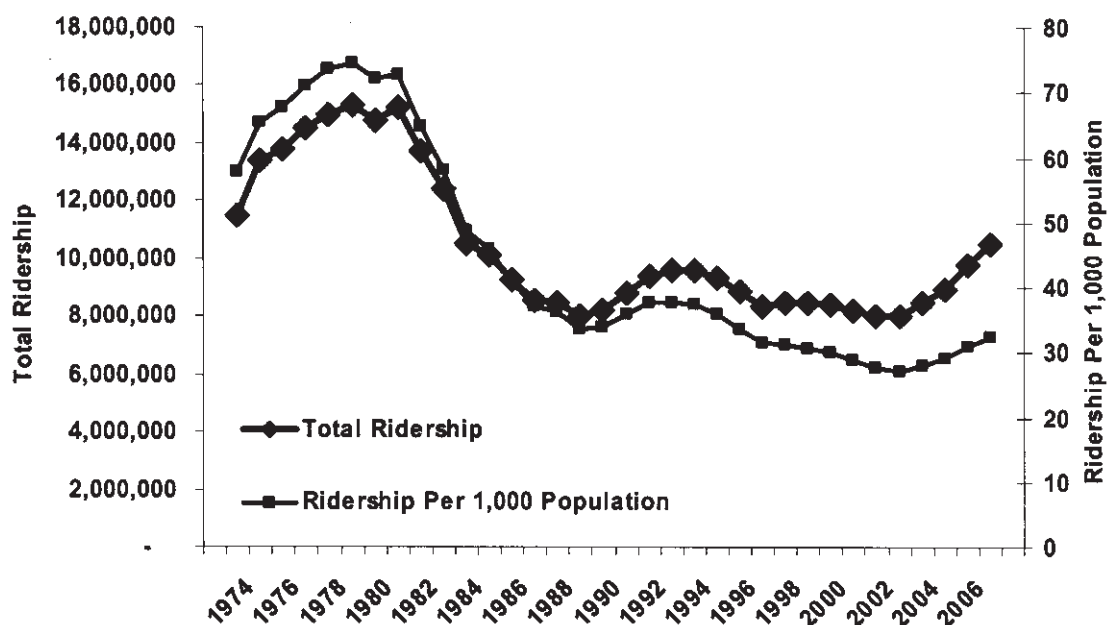
## Mass Transit

Mass transit is defined as all public transportation systems in which people travel in some conveyance other than their personally-driven cars. Increased use of mass transit can reduce pollution-generating activities by reducing the number of vehicles on the road and the vehicle-miles driven, which are primary sources of air pollution.

In Jacksonville mass transit is provided by Jacksonville Transportation Authority (JTA) and includes large buses, small para-transit buses for people with disabilities, downtown trolleys, and the Skyway (JTA has no plans to extend the Skyway system). JTA also provides buses for special events such as football games, and AirJTA, which includes free parking at Kings Avenue Parking Garage and a 40-minute bus ride to and from the Jacksonville International Airport.

Bus ridership, which had been declining in Jacksonville, has increased in the last few years. Total ridership decreased from 33,000 weekly in 1991 (48 riders per 1,000 population) to 27,700 in 2002 (34 per 1,000) before increasing to 38,000 in 2005 (44 riders per 1,000 population.) JTA experienced a 7.4 percent increase in ridership from 2005 to 2006. For comparison purposes, in the first half of 2006, bus ridership nationally increased by 3.2 percent. Some city bus agencies experienced double digit increases for the first six months of 2006. These were located in the following cities: Detroit, MI (14.2%); San Antonio, TX (13.2%); Dallas, TX (12.7%); and Seattle, WA (11.4%).

**JTA Bus Ridership 1973-2006**



Between 1973 and 1979, JTA acquired 250 new and larger buses to accommodate commuters from Mandarin, Orange Park, and the Beaches; developed park and ride lots; and provided a shuttle bus system serving the downtown area. During the same period JTA operated off-street public parking lots and increased the parking rates from 30 percent to about 75 percent of similar private parking lots. During that time annual bus ridership rose from 10.5 million in 1973 to a high of 15.8 million in 1980. Beginning in 1980 the picture changed: two million dollars in subsidies were cut; downtown shuttle buses were removed; JTA no longer operated the public parking facilities; and more public downtown parking spaces were created to accommodate development. By 1983 transit ridership fell back to the 1973 level of 10.5 million, despite the increase in total population in that time period. Other factors to be considered are the high gas prices and gas pump waiting lines that occurred between 1978 and 1985 and the bridge tolls which were removed in 1989.

Today, JTA's vision for mass transit in Northeast Florida includes a Bus Rapid Transit System employing new buses with improved comfort and appearance, outfitted with "clean-burn" diesel engines with the option to burn bio-diesel, operating in consolidated main corridor routes using express lanes reserved for buses during peak commuting hours. Smaller buses in neighborhoods and trolleys downtown would provide connections with the larger buses at central locations. Some of JTA's current initiatives include: a water-borne transit feasibility study, a commuter rail feasibility study, road and interchange improvements, an Intelligent Traffic System pilot program, Wonderwood Parkway, downtown transit improvements, transit route restructuring, a transportation center, and Transit Oriented Development. The JTA currently considers hybrid gas buses to be too expensive. Also at issue is whether the population density is sufficient to support the capital investment in a light rail system.

## ***Reducing Sprawl***

Improving air quality depends upon good urban planning. With Jacksonville forecast to have built out its available green areas by 2030, how that build-out will occur is linked directly to our future air quality because the single largest source of pollutants today comes from mobile sources—mostly cars, trucks, buses. In 2007, the 13 approved or planned Developments of Regional Impact in the greater Jacksonville area continue the trend of low-density sprawl, with one to three homes per acre of land. As southern Florida has built out, developers have redirected their attention northward, where abundant, relatively inexpensive land is available as slash pine farming becomes less profitable and the influx of new Florida residents continues unabated.

Efforts to contain Jacksonville within a "Green Belt" have not prevented major development from leap-frogging into neighboring counties. As the outlying population grows, Jacksonville's relative share of total resident population decreases. Such development requires a more regional approach to growth management and long-range planning.

Planning experts agree that building more roads does not equate to lessening traffic or reducing air pollution. What is required is strategic density increases tied to Transit Oriented Development. However, development responds to market forces and land use regulations. The relatively low cost of land in Northeast Florida, buyers' preferences for detached single family homes, our love affair with our automobiles, and the lack of consistent implementation of planning, zoning, land-use, and other growth management tools will guarantee more vehicle miles driven and attendant air pollution. Some accommodations are being made to promote work-here, live-here development.

Florida's Growth Management Act mandates that all local governments adopt a Comprehensive Plan that incorporates many elements, including housing, transportation, conservation, infrastructure, future land use, and inter-governmental coordination. Jacksonville's 2010 Comprehensive Plan, adopted in 1990, allocates acreage for specific purposes, such as residential, commercial and industrial development, public facilities, agriculture or forestry uses, and conservation, based on projected needs to meet planned growth. Changes in designations are permitted only by City Council action with oversight from the Florida Department of Community Affairs (DCA). Therefore, DCA plays a role in containing urban sprawl while providing room for market choice.

The challenge for Jacksonville's future is factoring air quality into its long-range growth management planning. Continued permitting of low-density urban sprawl will impact air quality and roadway congestion by increasing vehicle-miles driven and tailpipe emissions. Currently, Jacksonville is ranked near the middle of large U.S. cities with regard to sprawl. Jacksonville can significantly impact its future air quality by limiting the urban sprawl, creating higher density development, and revitalizing and in-filling in older neighborhoods.

Jacksonville vehicle miles driven have tripled in the past 30 years. According to Floridians for Better Transportation—a statewide business and transportation association created in 1988 by the Florida Chamber of Commerce and the Florida Council of 100 and dedicated to making transportation safer and more efficient in Florida—over the past 10 years Florida has increased its lane-miles of roadway at a rate of 1.3 percent per year, while Florida's population grows at 2.1 percent a year and vehicle-miles traveled increase at a rate of 3.7 percent annually.

Jacksonville is poised for a major expansion of its maritime commerce business as a result of increasing container freight business from Asia. In 2005 JAXPORT signed a 30-year lease with Mitsui O.S.K. Lines for a container facility projected to handle between 350,000 and 800,000 containers annually. Operations are scheduled to begin in late 2008. The Mitsui contract is projected to provide 1,600 new jobs and have a total impact of \$900 million a year for Jacksonville.

Rail represents the least polluting means of transportation of containers to destinations throughout the Eastern U.S. However, moving containers from the Jacksonville's port area to the Westside inter-modal rail yard currently takes up to two days by rail, while it is less than an hour by truck. Moving 800,000 containers annually by short-haul tractor-trailer trips would translate to up to 1.6 million truck transits per year on local and interstate roadways. That equates to more than 3 total trips per minute from and then back to the port, 24 hours a day, 365 days a year.

## **STRATEGIES FOR STATIONARY SOURCES - LARGE INDUSTRIES AND ENERGY PRODUCTION**

### ***Large Industries***

Strategies to reduce air pollution from stationary sources include controlling and reducing emissions at industrial sites, using alternative fuels at industrial sites, and reducing pollution-generating activities by changing the nature of industry in the area.

### ***Emission Controls***

Regulation of industrial emissions has led to cleaner industry and cleaner air. Key strategies for reducing emissions include “scrubbers” on smokestacks to remove particulates and/or gases from industrial exhaust systems, which can sometimes produce a usable by-product.

Cap and Trade programs use emission allowances as a means to comply with emission reduction requirements. A cap, lower than historical emissions, is set by the EPA on all regulated sources. Each source of specific pollutants can buy or sell allowances on the open market to other sources (or sometimes to environmental groups) so that total emissions are reduced. At the end of a compliance period, each source must own at least as many allowances as its total emissions.

### ***Alternative Fuels***

Across the world, a growing “Sustainable Manufacturing” movement is investigating alternative fuel sources for industrial uses. Many industries, especially those that need to create and sustain high temperatures, are looking for energy-rich alternative fuels such as consumer wastes and byproducts from other industries, including high-carbon alternatives such as used tires, paper, packaging, plastics, or sawdust.

## ***Targeting Green Industries***

Jacksonville has a 25 percent higher density of facilities that emit major pollutants than any other county in the North Florida district. Major industries in Northeast Florida include turpentine processing plants, with 80 percent of the world's turpentine processing done here. Other major industries that produce air pollution include brewing, sheet rock and asphalt shingle manufacturing, chemical processing, steel rod generation, can production, medical centers, coffee processors, military bases, and electric co-generation and steam production operations. Jacksonville has 20 recognized Major Facilities. However, Jacksonville has been successful in reducing pollution from stationary sources by 80 to 90 percent. In Duval County mobile sources produce nearly 350,000 tons of pollutants per year, power plants produce about 75,000 tons, and all other stationary and area sources produce less than 50,000 tons. Energy production continues to be the second largest category of pollutant producers.

## ***Energy Production***

The primary opportunities to reduce air pollution from the production of energy are through emission controls, alternative energy sources, and reduced energy use through conservation and other means to decrease the amount of energy that must be produced to meet consumer demands.

## ***Emission Controls***

The Clean Air Act of 1970 (CAA) has successfully reduced pollutant emissions both nationally and locally. Despite a 30 percent increase in electrical generation at fossil fuel power plants, since enactment of the 1990 CAA Amendment, there has been a surprising 30 percent decrease in sulfur dioxide emissions and a 40 to 45 percent decrease in nitrogen dioxide emissions. Controlling emissions can be accomplished by changing the type of fuels, replacing or upgrading older generating stations or power plants with more efficient systems, or by adding emission control devices. One might expect that the cost of emission control standards achieving these reductions would result in higher energy costs to the consumer. In fact, the cost of electricity nationally has fallen 10 percent since 1990. (Deregulation of the U.S. rail system and natural gas programs also may have contributed to lowering power rates by making fuel cheaper and more accessible to generating facilities, although much of JEA's coal comes by water.)

Technology has made significant strides in improving energy generation efficiency and reducing power plant pollutant releases even as energy demand has grown in the U.S. by an average of one percent per year. Research continues on innovations in energy production and fuel efficiency, including new ways to utilize current fossil fuels. Since coal is the United States' most abundant fossil fuel, government and industry have been working on methods to burn coal more cleanly, including reducing or capturing the carbon dioxide emissions from the combustion process. Coal gasification is one example. Rather than burning coal directly, gasification breaks down coal—or virtually any carbon-based fuel—into its basic chemical constituents. Carbon molecules in coal break apart, setting off chemical reactions that typically produce a mixture of carbon monoxide, hydrogen, and other gaseous compounds. The EPA views gasification as potentially one of the most effective ways to produce clean-burning hydrogen for future automobiles and power-generating fuel cells.

Coal gasification systems entail removal of sulfur impurities and their conversion into commercially valuable byproducts. Nitrogen oxides, another pollutant, are not formed in the gasification process. Instead, ammonia is created and easily stripped out of the gas stream. The hydrogen, carbon, and other gases are burned to fuel a gas turbine that drives an electric generator, while hot exhaust gases can be “recycled” to create steam for a conventional steam turbine-generator. These “combined cycle” gasification systems can achieve unprecedented power generation efficiencies. A conventional coal-fired boiler plant today can achieve 33-40 percent efficiencies, while the combined-cycle plant may approach 60 percent efficiency. Higher efficiencies mean the use of less fuel. However, coal gasification systems are not carbon neutral. In the end, they release carbon captured in fossil form into the atmosphere, eventually as carbon dioxide, a greenhouse gas.

Capture and sequestration, a process to remove and safely store carbon for coal plants, is still in the research stage. The process of capture will reduce the efficiency of the plant, and once carbon is captured, storing it is an unsolved problem. Overall costs would increase greatly, though research is needed to say how greatly. New techniques of capture, which reduce the plant's efficiency by about 15 percent, are proposed and will be tested soon. Research at the plants is planned in the U.S. by American Electric Power, FutureGen, and others.



Locally, Jacksonville has seen its electrical utility costs drop to the lowest in Florida, even as JEA facilities have undergone extensive technology upgrades and installation of state-of-the-art emission controls, spending more than \$300 million to retrofit its Northside Power Plant and now in the process of upgrading its St. Johns River Power Park facility. Lowering power generation costs and achieving emission reductions have been accomplished locally through all three of the strategies mentioned above: shifting to lower emission fuels; upgrading of power generation facilities; and installation of new emission control technologies.

Two important provisions of the 1990 Clean Air Act (CAA) gave utilities the flexibility to achieve the new air quality standards. The first was a cap-and-trade provision for sulfur dioxide emissions that allowed utilities to make emission trade-offs within their own generating systems or with other utility systems while staying below the overall cap on sulfur dioxide emissions. Additionally, the CAA's nitrogen oxide reduction program allowed flexible control strategies for utilities to meet mandatory emissions targets. However, it was the recent enactment of the Clean Air Interstate Rule (CAIR) by the EPA that initiated the cap-and-trade provision for nitrogen oxide.

For industries that have pollution control technologies commercially available, cap-and-trade rules can achieve significant reductions in pollution without causing drastic increases in the cost of electricity. For example, the University of Florida's Public Utility Research Center has studied the impact of CAIR, designed to achieve the largest reduction in air pollution in more than a decade. CAIR, which targets air pollution moving across state boundaries, will permanently cap emissions of sulfur dioxide and nitrogen oxides in 28 states across the Eastern U.S., including Florida. By 2015, CAIR will reduce sulfur dioxide emissions 70 percent and nitrogen oxide emissions by 60 percent below 2003 levels. The Public Utility Research Center estimates that in the upcoming Clean Air Interstate Rule, the average cost per household for state-wide compliance to the nitrogen oxide provision of CAIR would range from \$1.30 to as low as \$.30 a month, providing cap-and-trade flexibility is granted.

Currently emission controls for greenhouse gases such as carbon dioxide are not federally regulated or controlled. However, CO<sub>2</sub> emissions, already a global issue of debate, are becoming a national topic. The U.S. Supreme Court recently ruled that the EPA must set restrictions on greenhouse gas emissions. California has recently passed legislation that establishes a cap-and-trade program for carbon dioxide emissions. Some large corporations are already planning for the costs associated with federal legislation likely to be introduced in the next few years.

As with other emissions, reduction of CO<sub>2</sub> emissions can be achieved by alternative fuels, more efficient power plants, or with emission control devices. However, industry experts posit that most ways of reducing CO<sub>2</sub> emissions are complex, impractical and/or very expensive. Emission control devices to capture, convert or store the immense volumes of released CO<sub>2</sub> are currently cost-prohibitive. Alternatives then are either to reduce CO<sub>2</sub> emissions, make CO<sub>2</sub> emissions carbon-neutral, or use alternative technologies that do not emit CO<sub>2</sub> – or pollutants. These alternatives would include hydrogen, wind power, nuclear power, solar power, refuse energy, and carbon-neutral biofuels like ethanol. In Florida, fuels derived from biomass, in the form of large scale conversion of plant products, represent the most promising renewable energy source.



The dominant natural greenhouse gas is water vapor. Water vapor has a much higher concentration and a higher heat absorption rate than any other greenhouse gas. The most common human-made greenhouse gas is carbon dioxide, derived from the burning of fossil fuels. Climate models indicate that an increase in atmospheric temperature caused by the greenhouse effect from human-produced gases leads to an increase in the water vapor content. The increased water vapor, in turn, leads to an increase in the greenhouse effect. Thus water vapor in combination with other greenhouse gases acts to create a spiraling feedback loop, in which a rise in atmospheric and ground-level temperatures results in increases natural water vapor in the atmosphere.

## ***Alternative Energy Sources***

The JEA relies almost entirely upon coal and natural gas for power generation. JEA calculates the life-cycle costs per kilowatt hour, which includes the initial capital investment and estimated operating costs for 20 years, as \$74 per megawatt hour (\$74/MWH) for new coal and \$93/MWH for natural gas used in a combustion turbine with a combined cycle at base load generation level. Peak load generation costs for natural gas are \$192/MWH, and the peak load generation costs of a new power plant in Taylor County are \$58/MWH.

Florida is currently using renewable energy sources for approximately 2 percent of its energy capacity, primarily from municipal solid waste and biomass programs dating back to the early 1980s, when utilities were required by the federal government to purchase energy from renewable sources. No new large facilities have been built since.

Renewable energy sources often have hidden energy costs in production and transportation. Each must be evaluated as part of a larger picture, since many of the options require the expenditure of energy to access or develop the renewable energy source. However, potential increases in the costs of coal-based energy may alter the comparative costs of alternative energy sources, making those technologies more economically viable. The following are ranked according to current estimates of cost per megawatt hour, starting with the least expensive.

**Landfill** gas, or biogas, is the most cost competitive of renewable energy sources. In Jacksonville, JEA has three projects on “closed” landfills. A fourth, the Trail Ridge landfill, will be available in 2008. In addition, JEA also generates biogas from its waste water treatment solids. However, landfill gas has limited potential. Once landfill waste has been depleted through its natural decaying process, the facilities are of no further fuel generation value. In addition, “green” does not always mean “clean.” Methane, which is emitted from landfill, is 23 times more harmful as a greenhouse gas than carbon dioxide. Farm waste or other kinds of organic waste could be utilized, but these pose other challenges. (JEA estimates the life-cycle costs would equate to \$47 per megawatt hour.)

**Biomass** encompasses a wide range of living and recently living biological (mostly plant) material which can be used for fuel or industrial production. Most commonly, biomass refers to plant materials but can include biofuels like biodiesel and biogas. Wood waste from yards, tree trimming, land clearings, and cultivated energy crops represent the greatest potential for Florida of all renewable energy sources. One major benefit of biomass is that it is carbon neutral. Biomass also produces less sulfur dioxide and metals than fossil fuels. JEA has a joint project underway with the City of Jacksonville and Evergreen Inc. to convert yard waste to energy, planned for 2008.

At the state level, a large biomass project is planned for a 15,000-acre farm in the central part of the state. The upside to this project is that it is capable of producing a significant amount of power from crop waste (projected to generate 120 megawatts annually). However, crop land is expensive and the power generating stations must be close to the crop land so fuel transportation costs do not become excessive. Another major source of concern with biomass fuels is the availability of and variability in the fuel source. Both biomass and ethanol fuels include pollutants and petroleum savings as low as 30 percent because of the expenditure of fossil fuels in growing and processing the plant material. In addition, the agricultural operation used to generate the biomass can have an associated water quality impact. (JEA’s life-cycle cost estimate for biomass energy generation is \$100/MWH.)

**Municipal Waste Combustion** (MWC) accounts for 60 percent of Florida's current renewable energy power generation and disposes of about 20 percent of all Florida municipal waste. Through improved combustion processes and pollution control technology, MWC has evolved over the years to more completely and efficiently combust municipal waste and more safely dispose of ash residue. Advantages of MWC include greatly reduced volume of material to landfill and energy recovery. Jacksonville's current Trail Ridge landfill processes about 3,000 tons a day of municipal waste that, if combusted in a modern MWC facility, could generate about 80 megawatts of electric power. (\$163/MWH)

**Wind Power** is the fastest growing energy source in the world and Florida is corporate home of the largest U.S. wind farm generator, FPL Energy. FPL has 47 farms in 15 states, but notably none in Florida. The scientific community generally holds the opinion that Florida does not have sufficient wind to be a strong candidate for this technology. However, high resolution wind-mapping has not been done here, so it is uncertain whether the Jacksonville area can support offshore wind technology. Preliminary research indicates offshore areas adjacent to Miami, Pensacola and Jacksonville could be viable sites for offshore wind farms. Offshore wind power is in use in many parts of the world. (\$165/MWH)

**Tidal, Gulf Stream, and Wave Energy** sources have some potential but are at the very early stages of development. Tidal and wave energy are employed in other parts of the world. Florida is considered both wave and wind poor. Nonetheless, JEA has proposed a pilot project using hydro-turbine technology to harness the tidal flow of the Intracoastal Waterway. However, permitting and regulatory issues have been difficult to overcome because the U.S. Government has not yet seen sufficient research on the environmental impact of tidal energy generation, such as risks to marine life. Worldwide, many projects are underway which use the power of offshore waves. (Developmental, no JEA estimate available.)

**Solar Energy**, can be harnessed in a number of ways, including basic solar thermal systems used to heat water, large solar thermal power generators converting solar into mechanical energy to drive turbines, and photovoltaic cells that collect the sun's energy and convert it directly into electricity. Solar energy has less potential for utility power generation in Florida than biomass because the right conditions are not present for large-scale solar energy production. Florida's weather patterns and atmospheric makeup make it a "diffused" solar state as compared to Arizona, which is a "direct" solar state. A 2004 study by the National Renewable Energy Lab found that most of Florida averaged 5.0 to 5.5 megawatt hours of energy generation capacity per day, compared with most of Arizona's 6.0 to 6.5 megawatt hours per day, which indicates that Florida averages 83 percent of Arizona's available solar source.

Challenges to large scale solar energy systems include a wide cost disparity compared to coal-fired sources and large land area requirements (1,300 acres for a 300 MW solar system versus 35 acres for a comparable fossil-fueled steam turbine). Currently, the cost differential between generating electricity using photovoltaic technology

versus fossil fuel sources is enormous. JEA estimates it costs 20 times as much to generate one megawatt-hour of electricity using photovoltaic technology than using conventionally powered steam turbine. But while solar technology has been slow to evolve, the cost of solar power is projected to drop at least 50 percent every decade, which may make it a cost-effective alternative to carbon-based fuels. The Department of Energy predicts that within 10 years, photovoltaic power could be competitive in price with traditional sources of electricity. New technology that concentrates solar energy holds promise for large-scale solar farms.



Locally, JEA is focused more on providing incentives for customers to use solar hot water systems. To date, 900 such systems have been installed in Jacksonville with JEA incentives. Incentives such as rebates and tax deductions have been available but not consistently. Cost recovery for solar hot water installations typically ranges from 3 to 6 years, while photovoltaic installations may take 20 years or more to pay back. This pay-back time may be decreased with state or federal support or an increase in the cost of coal-generated electricity.

**Hydrogen**, is attractive as an energy source because its only waste product is water. Hydrogen technology has not evolved to the point of being economically feasible on a large scale. It currently lacks conversion, storage, and distribution infrastructure, as well as advancements in fuel cell technology. In addition, the hydrogen conversion process can be highly energy intensive, hampering its overall efficiency rating as an energy source and potentially reducing fossil fuel savings, depending on the technology used to generate the hydrogen. The Department of Energy holds some promise for an electrolysis process—using solar generated electricity—that separates the hydrogen and oxygen in water so the hydrogen can be used in fuel cells for transportation and in buildings.

**Nuclear Power** supplies about 20 percent of all U.S. electric power. Although no new U.S. nuclear plants have been ordered in the past 20 years, nuclear power use outside the U.S. continues to expand. The chief advantages of nuclear power are that it does not generate any air combustion pollutants or greenhouse gases and it can compete economically with coal-fired power systems. Its disadvantages include disposal of spent nuclear waste and public fears about nuclear facilities. Fast neutron reactors would answer many of the objections to nuclear power—they use spent fuel from current reactors as their fuel and produce waste with only low-level short-term radioactivity—but would be expensive.

## ENERGY CONSERVATION

Conservation includes reduced consumption by improving efficiency and changing human behavior. Conservation methods associated with electrical generation include:



### *More Resource - Efficient Building Standards*

Initiatives under the umbrella of Green Built Homes of Florida include Energy Star and Water Star facilities that are at least 15 percent more efficient than homes built to Florida Building Codes. The U.S. and Florida Green Building Council actively promote energy efficient buildings that conserve resources not only in their eventual operation but in the building process as well. The Green Building Council also promotes the national Leadership in Energy Efficiency Design (LEED) rating system, the nationally accepted benchmark for the design, construction and operation of high performance green buildings. Locally, JEA offers incentives to home builders to pay for achieving the Energy Star rating on their structures. LEED-rated buildings are assessed in five areas of human and environmental health, including energy efficiency. The University of North Florida recently completed the first LEED-certified building in Jacksonville and plans for all future buildings to meet LEED standards. A proposed City of Jacksonville ordinance on green building is currently under review.

### *More Efficient Appliances*

Replacing older, energy-inefficient appliances and electrical fixtures can conserve energy and create significant savings for consumers. Use of Energy Star-rated appliances, replacement of incandescent light bulbs with compact fluorescent bulbs, use of timers on high-energy items used cyclically, such as water heaters and pool pumps, also result in energy conserved. However, low-income families have difficulty meeting the up-front expenses of purchasing more energy-efficient appliances or making their homes more thermally efficient. Energy policies are required to help put conservation measures within everyone's reach.

## ***Managing Customer Demand***

Utilities have typically billed customers a set charge for a portion of the utility's fixed asset costs (the largest cost component of their operation), plus a rate charge per kilowatt used that recovers the balance of fixed asset costs, plus actual energy generation (primarily fuel) costs. As a result, under this rate structure utilities have little incentive to curb customer usage. In fact, more usage generates more income—above and beyond the actual production costs. One recommended step by research experts is to change the rate structure to incorporate full fixed asset costs into the base charge customers pay, thus decoupling the link between consumption and fixed cost recovery. California implemented this system and has seen energy use per capita stabilize or decline. A second rate adjustment strategy suggested by experts is to modify customer behavior by implementing demand reduction programs that smooth out energy demand by “rewarding” those who reduce demands during peak hours. JEA is currently reviewing a portfolio of conservation programs focused on reducing demand during peak usage hours. Peak-reduction programs can reduce the need for new power plants.

Strategies to reduce energy consumption, as well as consumer strategies to improve efficiency, do not necessarily translate to lower usage. Utilities have observed a “rebound effect,” suggesting that consumers who save money on their electric bill because of improved efficiency often spend those savings on additional appliances and on consuming more energy, such as keeping their homes a few degrees cooler in summer or warmer in winter.

## ***Consumer Education and Awareness***

Calls for energy conservation and environmental protection come from all levels of government and the utility industry in an effort to change public behavior. JEA has a continuous education and public awareness campaign focused on environmental protection, and reducing water and energy waste or consumption. Their services range from home and business energy audits to tips to reduce air conditioning, refrigeration and water heating costs. JEA offers teachers free education resources for students, and topics for science projects. A speakers' bureau provides resource persons to the community to address environment, air quality, energy and related issues. Despite these efforts, some question their effectiveness in changing consumer behavior.

## ***JEA Clean Power Program***

JEA has worked with local environmental groups to establish a Clean Power Program. In 1999, through a Memorandum of Understanding (MOU) with the Sierra Club of Northeast Florida and the American Lung Association (ALA), JEA committed to develop and implement a program to achieve a 7.5 percent of retail sales from clean power capacity by 2015. Currently, JEA generates 1.33 percent of energy from all types of solar systems, biogas, and biomass. Another 3.12 percent capacity is claimed for the Clean Power Program from system efficiencies and a Nebraska wind farm. The original MOU, recently modified to a “Clean Power Action Plan,” established an Advisory Panel which provides guidance and recommendations to JEA. Current panel members include representatives from the Sierra Club, American Lung Association, and the City of Jacksonville Environmental Protection Board.

Progress has been made toward JEA's clean power goals, including installation of clean power systems, commitment to power purchase agreements, and research and development into clean power technologies. JEA currently has about 91 MW of renewable capacity committed toward its clean power goal, including approximately .32 MW of solar Photo Voltaic capacity, 9 MW of solar thermal, 6 MW in landfill biogas, .8 MW in digester biogas capacity, 10 MW of wind, 22 MW of proposed landfill and biomass projects and 43 MWs of energy efficient system improvements.



Since 1997, JEA has invested over \$1 billion repositioning its local electric generation, focusing on a diverse portfolio to help ensure electric reliability in the event of scarcity of a particular fuel (such as the gas shortage during recent hurricanes) and has helped stabilize electric rates. Some key features of the generating portfolio include:

- Decommissioning the Southside Generating Station to make way for additional downtown improvements, even though the unit had substantial additional operating life;
- Redesigning the Northside Generating Station as a clean coal technology project in collaboration with the Department of Energy. This facility produces 2.5 times the power of the units that it replaced and has 10 percent less emissions than the former gas and oil units at the same site. JEA worked with local environmental stakeholders including the Sierra Club, American Lung Association, and Northside Civic Association to create the Community Commitment, a series of voluntary limits adopted into the operating air permits for the facility that are more stringent than state and federal standards require; and
- Construction of the Brandy Branch Combined Cycle Generating Station, which burns natural gas in a combined cycle that captures emissions to power a steam turbine.

### ***Preservation Project***

Under the Better Jacksonville Plan, Jacksonville's Preservation Project has set aside 81 square miles of green space and environmentally sensitive land. This project—engaging a unique partnership of the city, state, and federal governments, JEA, the St. Johns River Water Management District, the Regional Council, and conservation agencies such as the Nature Conservancy and the Trust for Public Lands—has become a successful environmental preservation and growth management tool. It was funded by a half-cent sales tax approved by voters in 2001.



*Committee members met from October 2006 to May 2007 at JCCI. In addition, the management team met many times to provide guidance and direction for the study. The committee received information from many knowledgeable resource speakers and additional resource materials researched by JCCI staff.*



## BEST PRACTICES

### ***Visionary Leadership***

- Houston has updated its 2000 emissions inventory and added greenhouse gases to more accurately track progress toward reducing greenhouse gases within the city. The city has joined the international network, Local Governments for Sustainability, to assist in greenhouse gases reduction. The City reduced nitrous oxide emissions by 23 percent, in part due to reduced fleet size and replacement of vehicles with new hybrids, and upgraded boilers at waste treatment facilities and the airport.
- Medford, Massachusetts has initiated an anti-idling campaign and installed Diesel Particulate Filter (DPF) systems and Diesel Oxidation Catalysts (DCO) in school buses and public works fleet for an EPA estimate of 60 percent reductions in hydrocarbons, particulate matter and carbon monoxides.
- Pittsburgh's Green Building Alliance is a non-profit organization that integrates environmentally responsible design, construction, and operating practices to improve health, economic, environmental and social value in new and existing buildings.
- Sarasota established an Office of Sustainability within the city government.
- Toronto established the "Change is in the Air" public education program to enlist residents, businesses, industry and city government to take actions to reduce greenhouse gas emissions.

### ***Health***

- Atlanta's Clean Air Campaign motivates residents to take action to improve air quality and reduce traffic congestion through employer programs and incentives for carpooling, vanpooling, telecommuting, and transit pass programs.
- Atlanta Healthy Places Research Group, led by Emory University's Rollins School of Public Health, Georgia Tech's College of Architecture, Center for Quality Growth and Regional Development, and professionals from the Centers for Disease Control, meets once a month to discuss issues of health policy and impacts, and to explore and evaluate development, design and construction of buildings that promote health and restore communities.

### ***Regional Planning for Growth***

- Portland, Oregon's Metro Studies Institute, a 20-year standing community-based board, provides a neutral forum to discuss issues crossing jurisdictional and organizational boundaries, sponsors public service research, publishes Metroscope, coordinates an annual symposium, and educates professionals and the general community to achieve planning and conservation objectives.
- Gainesville, Florida has developed a Green Municipality standard, and the Green Building Program offers a 50 percent discount on building permits and fast-track permitting for green building projects.
- Boulder, Colorado created a Regional Air Quality Council with authority to implement changes.

### ***Alternative Energy***

- Sustainable Sarasota is working with FPL to create one of the largest solar energy plants with 250 kilowatts (250 KW) of capacity in the southeast located at a closed landfill site. FPL's Sunshine Energy Program accepts voluntary electric bill contributions of \$9.75 per month from customers to assure that 1000 KWH (kilowatt hours) of electricity from cleaner generators such as wind, biofuels, or solar will be produced in Florida or elsewhere. For every 10,000 customers who subscribe, FPL will add an additional 150 KW of solar capacity to be generated in Florida.
- St. Lucie County, Florida is building a plasma-arc facility to burn trash, reducing landfill while simultaneously producing electricity to be sold back to the grid, 80,000 pounds of steam to be sold to Tropicana Products facility to power turbines, and slag byproduct to be used in road-paving.
- San Francisco voted for a \$100 million bond issue to pay for solar panels, wind turbines, and energy-saving measures for public facilities repaid by savings on fossil fuel energy.

- Minneapolis has two new solar arrays that track the sun's path and are connected directly into the City's maintenance facility building's power system so no batteries are needed.
- Burlington, Vermont, as of June 2006, has derived 67 percent of Burlington's Electric Department's portfolio from renewable energy.
- Seville, Spain has created the first commercial concentrating solar power plant with 11 MW capacity, equivalent to the electric needs of 180,000 homes.

### ***CO2 Reduction***

- Vattenfall, Germany piloted a carbon capture system, burning lignite in pure oxygen, for a coal-fired power plant that could be employed in the planned JEA power plant in Taylor County.
- Pacific Gas and Electric "Climate Smart" program offers customers the option of offsetting carbon produced, based on their electric usage, to finance conservation and carbon removal projects. This voluntary "carbon tax" program costs the average user less than \$4.50 per month.

### ***Mass Transit***

- Portland, Oregon's TriMet transit system carries more people than any other U.S. transit system its size, with ridership outpacing population growth. TriMet eases traffic congestion and provides cleaner, healthier air. It has a 44-mile regional light rail system interfacing with 91 bus lines using 606 buses, with a 70 percent choice ridership. Peripheral Park and Ride lots can accommodate 10,000 vehicles. More light rail is under construction and planned.
- Ottawa, Canada and Brisbane, Australia created Intelligent Transportation Systems (ITS) which allow exclusive bus lanes to travel unimpeded by red traffic lights. Annual ridership is 85 million and 42 million, respectively, compared to Jacksonville's nine million.
- Gainesville, Florida has a Year 2025 Long-Range Transportation Plan that will promote denser population growth, more balance between east and west growth areas, and connections with a limited number of highly developed mixed use centers, and served by a multi-modal transportation system. Included in the plan are walkable University and town centers, improved and affordable transit service, improved bike and trail ways, and better road connectivity.

### ***Personal Action***

- Sustainable Atlanta Roundtable provides a monthly forum to engage community leaders and citizens in awareness of public health and environmental issues and actions.
- Greenprint Denver is a community-wide initiative to promote sustainable development and ecologically responsive practices, such as recycling, xeriscaping, use of hybrid vehicles, green building.

### ***Mobile Sources***

- The California Resource Board has instituted the Zero Emissions Vehicles (CARB ZEV) Program which requires auto makers to place a number of emission free vehicles on the road by 2009. Eleven other states have adopted this plan.
- Seattle's Clean Green Fleet (3,250 city vehicles) began in 1992 with compressed natural gas, a cleaner burning fuel and in 2000 hybrid electric cars were added. In 2001 the diesel fleet was converted to cleaner ultra-low sulfur diesel; and in 2002 the fleet was downsized by 200 vehicles.

### ***Building Codes and Practices***

- Alameda County, California's Weatherization Cash Grant Energy Efficiency Program, in which 80 percent of cost of weatherization, up to \$960, is paid by Alameda Power and Telecom.
- California offers a 100 percent property tax exemption for installation of solar systems, including water heater, space heat, solar mechanical energy, and photovoltaic systems.
- Anaheim, California's Public Utilities offer incentives to encourage Green Building and LEED Certified building projects.

## ***Cost Effective Changes***

- California cities encourage residents to install energy efficient appliances, including washers, dryers, refrigerators and HVACs through rebate programs, funded by local utilities.
- Colorado Springs Utilities wrote energy codes at least 30 percent more stringent than state codes for city and utility buildings, with a 40 percent savings in electric and gas consumption.
- Eugene, Oregon installed four solar water heating systems in city-owned facilities, including swimming pools and fire stations, saving \$11,000 per year in energy costs, funded by state and local incentives and rebates, and selling tax credits to local investors.

## ***Other***

- Arlington, Texas (as well as many other cities) installed LEDs in traffic lights. The city also replaced incandescent bulbs with energy efficient compact fluorescent bulbs, and installed automatic “no-action” light switches in city buildings.
- Boston has installed green roofs on ten city buildings, reducing heating and cooling energy consumption, urban heat island effects, and storm water runoff.
- Albuquerque has an Air Aware Gas Cap Exchange to replace leaking, missing, or faulty automobile gas caps on cars, trucks, and recreational vehicles.

# CONCLUSIONS

*Conclusions express the value judgments of the committee, based on the findings.*

1. Air quality affects everyone, because everyone breathes air. Pollution in the air directly enters the lungs, and from there into the blood stream, and makes people sick. Cleaner air promotes health in the community, which in turn improves productivity and quality of life while reducing health care expenditures, hospital visits, and lost work days.
2. Jacksonville’s air quality currently meets all existing National Ambient Air Quality Standards (NAAQS), but that has not always been the case. Northeast Florida’s population growth rate will bring more pollution, which is harmful even at low levels. In addition, the NAAQS do not cover evolving knowledge of the harmful effects of air toxics and CO<sub>2</sub>.
3. Northeast Florida lacks a vision for future population growth that includes protecting air quality. It has been satisfied merely to meet minimum national air standards. Northeast Florida has no plans for a continuously improving air quality model to protect its citizens and the natural environment. Northeast Florida lacks regional planning that links land use, zoning, transportation (including mass transit), and air quality issues.
4. State and local air quality enforcement authorities have been frustrated in effectively controlling emission levels of air toxics because of the absence of risk-based exposure standards for pollutants, such as benzene and mercury.
5. Northeast Florida lacks visionary leadership to address air quality and climate issues through regional coordination, regulatory mechanisms, governmental cooperation, and community and cultural change. Since reaching attainment status, the level of public funding has not been sufficient to be proactive in addressing air quality issues. The complexity of air pollution control regulations, regulatory processes, and the distribution of regulatory responsibilities makes it difficult to manage air pollution issues.

## CONCLUSIONS

6. Jacksonville air quality policies have not been driven by enlightened environmental efforts and successes in other communities nationally and globally, and the public has not pushed for these policies. In addition, people generally lack sufficient motivation to take personal action because many people
  - do not believe environmental problems exist;
  - lack education and awareness of air quality issues;
  - are unwilling to assume personal responsibility for actions that impact the environment;
  - cannot afford the upfront costs of energy-saving actions; and
  - resist change due to habit and convenience.
7. Jacksonville relies on non-renewable energy sources for energy production and transportation, primarily coal and fossil fuels that produce CO<sub>2</sub>—a major greenhouse gas implicated in climate change—which is an issue of special concern to Florida because of its low elevation and vulnerability to tropical storms.
8. Jacksonville and Northeast Florida have not aggressively pursued or employed research on promising alternative energy technologies.
9. Based on the relative size of Duval County and the number of major pollution-generating facilities, not enough air quality monitoring sites are funded and provided, and not enough monitoring is done to identify air quality “hot spots.”
10. Not enough epidemiological studies are undertaken to assess air quality effects on populations living close to air quality hazards.
11. Mobile sources (cars, trucks, buses, trains, etc.) produce the largest amount of air pollutants in Northeast Florida, and this amount is likely to increase with population growth. Stationary sources (such as coal-burning power plants) are responsible for the largest amounts of the CO<sub>2</sub>, mercury, and nitrogen oxides produced locally, and this amount is likely to increase with the energy demands of population and economic growth.
12. Insufficient use of mass transit, together with its unavailability on a regional basis, leads to more people driving their own cars and to more pollutant emissions.
13. Jacksonville’s building codes insufficiently address environmental concerns and energy conservation.
14. Addressing environmental concerns need not conflict with economic prosperity. While environmentally responsible actions cost money, going “green” can be cost effective for business. However, what is good for the economy short-term may not be good for the environment. For example, strong economic drivers such as port development, which brings jobs and money into the community, can also bring large numbers of trucks onto the roadways, resulting in air pollution. In attempting to balance these concerns, Jacksonville does not model or measure the trade-offs between and among the environment, energy needs, and the economy.
15. Jacksonville—with its strong interest in quality of life, its rich and diverse ecosystems, and its progressive and cooperative spirit of communication between citizens, government officials and industry leaders — has an opportunity to become a national leader for improving air quality through use of innovative technologies, strategies and strong community support.

## RECOMMENDATIONS

*Recommendations are the committee's specific suggestions for change, based on the findings and conclusions.*

Everything Jacksonville residents enjoy about Northeast Florida—its livability, natural environment, and good air quality—is endangered with uncontrolled growth in population and energy use. Without visionary leadership and the dynamic participation of the citizenry, Jacksonville, with the projected doubling of the population of Northeast Florida by 2030, could become another Atlanta. Northeast Florida needs to protect its future, and there are roles for every segment of society—the government, business, and private individuals. The Recommendations of this study are largely directed at governmental entities. However, to help shape the future of the region, every citizen—as consumer, employee, business person, parent—has an important role to play in becoming informed about the health risks of air pollution and in reducing air pollution. Using less energy and driving fewer miles produces less polluting air emissions. (See the back cover for some suggestions.) Individual and political action can create common ground to reduce air pollution and provide for a sustainable future.

1. The Mayor of Jacksonville should appoint a Sustainability Officer to coordinate efforts to establish goals, objectives, and targets for air quality improvement and long-range sustainability plans. The Sustainability Officer should engage the universities, businesses, government entities, environmental groups, and the general public and should lead the effort to:
  - explore the model of Cool Cities and the Mayors' Climate Protection Agreement and its objectives to develop and adopt local feasible goals for reducing greenhouse gases;
  - create a plan to address climate change impacts and greenhouse gases in Duval County incorporating goals and measurable outcomes;
  - provide a model for citizens, by having energy efficient compact fluorescent light bulbs (CFLs) installed in all city facilities and providing a responsible CFL disposal program;
  - strengthen the Environmental Protection Board's role in educating the general public, identifying environmental problems, and enforcing compliance within Jacksonville's long-range sustainability plans; and
  - engage the city's various Citizens Planning and Advisory Committees (CPAC) and neighborhood associations in developing air pollution, health, and energy conservation awareness.
2. The Jacksonville City Council should revise the city's building codes to incorporate Green Building Standards to increase energy efficiency. It should also encourage the installation of Energy Star compliant appliances and equipment, following standards of the Florida Green Building Coalition (FGBC) and U. S. Green Building Coalition's Leadership in Energy and Environmental Design (LEED).
3. The City of Jacksonville and all the various Authorities, Jacksonville Transportation Authority, and Duval County Public Schools and its transportation contractors should increase the percentage of their fleet of hybrid and alternative fuel vehicles to reduce mobile emissions and improve air quality and to help establish in the city an infrastructure for alternative fuels that citizens can access.
4. JEA should continue to lead community education efforts on energy conservation. For example, JEA should:
  - expand its education programs that provide consumer-friendly information and advance its initiatives on energy conservation programs that take into consideration family income;
  - initiate a compact fluorescent light (CFL) bulb distribution program—that includes a plan for proper CFL disposal—and publicize its success; and
  - assist the City of Jacksonville and the various Authorities to improve how their websites highlight energy conservation information and initiatives.
5. In order to control greenhouse gas and other emissions, JEA, as the largest municipally-owned utility in Florida, should continue to implement their expressed purpose—to improve the quality of life in the communities they serve by
  - restructuring electric rates to encourage conservation of energy;



## RECOMMENDATIONS

- increasing the percentage of local energy production from renewable sources; and
  - exploring alternative technologies—such as biomass, solid waste and nuclear power production, and carbon sequestration.
6. The City of Jacksonville’s Environmental Quality Division should evaluate increasing air quality monitoring sites, focusing on “hot spots,” and modeling and recommending limits on pollution causing activities. These efforts should establish goals that go beyond compliance with National Ambient Air Quality Standards.
  7. The Florida Department of Health and Duval County Health Department should increase public health studies in air quality “hot spots” to better understand the relationship between local air pollutants and health effects. Together they should increase their public awareness campaigns about the health effects of air pollutants.
  8. To encourage greater development and use of mass transit, JTA should:
    - be authorized and assigned control of public downtown off-street parking;
    - work to end all subsidies for downtown public parking and move toward market rates;
    - lower rates for parking for high occupancy vehicles (carpools);
    - work with the Metropolitan Planning Organization to advertise and promote vanpooling and carpooling throughout Jacksonville, including suburban office areas;
    - advocate for a sufficiently complete public transit system and consider a light rail system to encourage and accommodate more ridership;
    - develop a new dedicated source of revenue to be funneled into mass transit;
    - convert existing parking structures and parking lots into commercial, residential, and office space; and
    - offer incentives to businesses to provide alternatives to the use of single occupant vehicles.
  9. The Jacksonville Regional Chamber of Commerce, as well as all the other Chambers of Commerce, and the City of Jacksonville—as models to businesses—should encourage and offer incentives to employees to use mass transit and offer further alternatives to single occupant vehicles such as vanpools and carpools.
  10. To reduce vehicle emissions from excessive and unnecessary idling in traffic, the City of Jacksonville should follow the example of other successful cities employing Intelligent Transportation System technology.
  11. In the interest of the community, the Jacksonville Port Authority should lead a partnership of city and state officials, JTA, Metropolitan Planning Organization, individual shipping companies, and CSX Transportation, Florida East Coast Railway, and Norfolk Southern Railway companies to cooperate in increasing rail shipment and decreasing shipment by trucks from new and existing ports to conserve energy, decrease mobile emissions, and relieve traffic congestion in the port area.
  12. As recommended in JCCI’s 2000 *Improving Regional Cooperation* and 2001 *Growth Management Revisited* reports, the Florida Legislature should establish a Northeast Florida Regional Transportation Authority (or expand the scope of the JTA throughout the region) and authorize appropriate, broadbased regional funding mechanisms to create and implement regional transportation plans. The Northeast Florida Regional Transportation Authority should thoroughly explore the achievability of all manner of mass transit including light rail, commuter rail, and water-borne transportation systems.
  13. The Florida Legislature should empower the Northeast Florida Regional Council with authority to coordinate and enforce regional planning including transportation, land use, and the natural environment. The Legislature should provide the Northeast Florida Regional Council with a dedicated source of revenue for sufficient, broad-based resources and staffing to perform these additional functions effectively.
  14. The United States Congress should adopt improved Corporate Average Fuel Economy (CAFE) standards to reduce mobile emissions from passenger cars and light trucks.

## REFERENCES

Air Quality, Florida:  
[www.dep.state.fl.us/air/programs/airquality.htm](http://www.dep.state.fl.us/air/programs/airquality.htm)

Air Quality Program, State of Washington:  
[www.ecy.wa.gov/programs/air/airhome.html](http://www.ecy.wa.gov/programs/air/airhome.html)

Alliance to Save Energy: [www.ase.org](http://www.ase.org)

American Council for an Energy-Efficient Economy:  
[www.aceee.org](http://www.aceee.org)

American Lung Association: [www.lungusa.org](http://www.lungusa.org)

AQI, National: [www.epa.gov/airnow/aqibroch](http://www.epa.gov/airnow/aqibroch)

Bio-mass Fuel:  
[www.treepower.org/biomass/quickfacts.html](http://www.treepower.org/biomass/quickfacts.html)

Choose Clean Air: [www.cleanair.utah.gov](http://www.cleanair.utah.gov)

Clean Cities: [www.eere.energy.gov/cleancities](http://www.eere.energy.gov/cleancities)

Cool Cities: [www.coolcities.us](http://www.coolcities.us)

Cool Mayors for Climate Protection: [www.coolmayors.org](http://www.coolmayors.org)

Corn-based containers: [www.enviropductsinc.com](http://www.enviropductsinc.com)

Cost of Freight Transport: [www.pacinst.org](http://www.pacinst.org)

Eco-Friendly products: [www.ecomall.com](http://www.ecomall.com)

Energy Star Program: [www.energystar.gov](http://www.energystar.gov)

Environment Florida:  
[www.environmentflorida.org/clean-air](http://www.environmentflorida.org/clean-air)

Exposure to Diesel Exhaust on School Buses:  
[www.ehhi.org/reports/diesel/](http://www.ehhi.org/reports/diesel/)

Florida Green Building Coalition:  
[floridagreenbuilding.org/](http://floridagreenbuilding.org/)

Green Built Homes of Florida—JEA:  
[www.jea.com/business/services/greenbuilt/index.asp](http://www.jea.com/business/services/greenbuilt/index.asp)

Green Hotels: [www.greenhotels.com](http://www.greenhotels.com)

JTA Rapid Transit Service Plan for 2025:  
[www.jaxtas.com](http://www.jaxtas.com); [www.jaxrapidtransit.com](http://www.jaxrapidtransit.com)

One Billion Bulbs: [onebillionbulbs.com](http://onebillionbulbs.com)

Pacific Gas & Electric Co., Clean Air Transportation:  
[www.pge.com/cleanair](http://www.pge.com/cleanair)

Recycling sites: [www.earth911.org/master.asp](http://www.earth911.org/master.asp)

Reduce Your Energy Consumption:  
[www.powerscorecard.org/reduce\\_energy.cfm](http://www.powerscorecard.org/reduce_energy.cfm)

Sierra Club on Sprawl:  
[www.sierraclub.org/sprawl.factsheet.asp](http://www.sierraclub.org/sprawl.factsheet.asp)

Six Common Air Pollutants: [www.epa.gov/air/urbanair/](http://www.epa.gov/air/urbanair/)

Trust for Public Land: [www.tpl.org](http://www.tpl.org)

Urban Planning for Sustainable Future:  
[www.csiro.au/cisro/content/standard/psaq.html](http://www.csiro.au/cisro/content/standard/psaq.html)

U.S. D.O.E, Energy Efficiency and Renewable Energy  
 Network: [www.eren.doe.gov](http://www.eren.doe.gov)

U. S. Green Building Council (LEED): [www.usgbc.org](http://www.usgbc.org)

Worldwatch Institute:  
[www.americanenergynow.org](http://www.americanenergynow.org)

## RESOURCE SPEAKERS

Denise Bunnewith  
 First Coast Metropolitan  
 Planning Organization

Ed Castellani  
 Jacksonville Transportation  
 Authority

Roger Chubin  
 IFF Chemical Holdings, Inc.

Andrew Collins  
 Florida Department of  
 Environmental Protection

John Crofts  
 City of Jacksonville  
 Planning and Development  
 Department

Lad Daniels  
 First Coast Manufacturers  
 Association

Bruce Doueck  
 Jacksonville Electric  
 Authority

Sam Houston  
 City of Jacksonville  
 Transportation Director

Tom Jury  
 Jacksonville Transportation  
 Authority

Diane Kerr  
 Neighborhood Activist

Chris Kirts  
 Florida Department of  
 Environmental Protection

Tom Larson  
 Sierra Club of Northeast  
 Florida

Cindy Laquidara  
 City of Jacksonville General  
 Counsel's Office

Bill Nowlin  
 Duval County Health Dept.

Kim Owens  
 Jacksonville Electric  
 Authority

Steve Pace  
 Air and Water Quality  
 Division  
 City of Jacksonville

Cheryl Pearson  
 American Lung Association

Tom Robinson  
 Robinson Better Business  
 Ideas, Inc.

Todd Sack, M.D.  
 Florida Energy Commission

David Solomon  
 Duval County Public  
 Schools

Paul Sotkiewicz  
 Public Utility Research  
 Center  
 University of Florida

Brian Teeple  
 Northeast Florida Regional  
 Council

Michael Templeton  
 Jacksonville Environmental  
 Protection Board

Patrick Welsh  
 Advanced Weather  
 Information Systems Lab  
 University of North Florida

Banta H. Whitner, LCSW  
 Psychotherapist and  
 Consultant

Kevin W. Wolfe, M.D.  
 Specialist in Pulmonary  
 Diseases

## COMMITTEE



**Air Quality  
Study Chair:**  
**Quinton White, Jr.**

### Management Team:

Don Anderson  
Walt Bussells  
Cara Connolly  
John Delaney  
Jennifer Gornto  
Elizabeth Means  
Mike Miller  
Steve Pace  
Sudhir Prabhu  
Eric Smith, Sr.  
Paul Steinbrecher

### Committee Members:

Richard Banks

Sarah Boren  
David Boyer  
Phil Condon  
Alberta Espie  
James Geller  
Gabe Hanson  
Mike Hartman  
Mary Hayford  
Wayne Hogan  
Bruce Humphrey  
Jill Johnson  
Joanne Kazmierski  
Karen Kempf  
Berdell Knowles  
Bill Larson

Mark McCranie  
Dave McLintock  
Quilla Miralia  
John Otterson  
Marvin Reese  
Gloria Rinaman  
Jim Rinaman  
Terry Shriver  
Scott Skinner  
Mike Stuck  
Rod Sullivan  
Allen Tilley  
Peggy Tilley  
Christi Veleta  
Ken Wilson

## JCCI BOARD OF DIRECTORS

President, Allan T. Geiger  
President-elect, Helen D. Jackson  
Treasurer, Ron Autrey

### Vice Presidents

Edward F.R. Hearle  
Patricia Hogan  
Sallyn S. Pajcic  
Mary Ellen Smith  
A. Quinton White, Jr.  
Forward Liaison  
Carla Marlier  
Board of Directors  
Christine Arab  
David D. Balz  
Dana Ferrell Birchfield  
Jordan Boss  
David D. Boree  
Michael T. Boylan  
Sally H. Douglass  
J. Randall Evans  
Ronnie A. Ferguson  
Patricia Gillum Sams

Carol J. Hladki  
Eric J. Holshouser  
Allison Korman  
William C. Mason III  
Michael Munz  
Marsha G. Oliver  
Carole Poindexter  
Judith C. Rodriguez  
Bryant Rollins  
Martha Valdes-Pellino  
Thomas M. Van Berkel  
Richard N. Weber  
James A. Williams  
Mary Lou Zievis

### Past Presidents

J.J. Daniel  
Jack H. Chambers  
Yank D. Coble Jr.  
Robert D. Davis  
George W. Corrick  
Howard R. Greenstein  
Jacquelyn D. Bates

David M. Hicks  
James C. Rinaman  
Kenneth Eilermann  
J. Shepard Bryan Jr.  
Juliette Woodruff Mason  
Lucy D. Hadi  
Charles P. Hayes Jr.  
Steve Pajcic  
Tracey I. Arpen Jr.  
Guy Marvin III  
Luther Quarles III  
W. O. Birchfield  
Michael J. Korn  
William E. Scheu  
Afesa Adams  
William D. Brinton  
Sherry Burns  
Sue K. Butts  
Edgar Mathis Sr.  
David M. Foster  
John R. Cobb  
Gerald W. Weedon  
Mary Ellen Smith

## JCCI STAFF

Charles R. "Skip" Cramer  
Executive Director

Ben Warner  
Deputy Director

Samantha Allick  
Communications Director

Chandra Echols  
Executive Assistant

Sandra Edwards  
Administrative Assistant

Earlene Hostutler  
Administrative Director

Karen Kempf  
JCCI Forward Planner

Laura Lane  
United Way Planner

Kathleen McKenzie  
Community Planner

Cheryl Murphy  
Development Director

Steve Rankin  
Advocacy Planner

Michelle Simkulet  
Finance Director/HSC  
Coordinator

Lashun Stephens  
HSC Planner

*Our Mission Statement*  
*Jacksonville Community Council Inc. (JCCI) is a nonpartisan civic organization that engages diverse citizens in open dialogue, research, consensus building, advocacy and leadership development to improve the quality of life and build a better community in Northeast Florida and beyond.*

## PREVIOUS JCCI STUDIES

<u>STUDY</u>	<u>CHAIR</u>	<u>STUDY</u>	<u>CHAIR</u>
1977 Local Government Finance	Robert Davis	1995 JAXPORT: Improvement and Expansion	Jim Ade
1977 Housing	Thomas Carpenter		
1977 Public Education (K-12)	Robert W. Schellenberg	1996 Creating a Community Agenda: Indicators for Health & Human Services	Bruce Demps
1978 Public Authorities	Howard Greenstein	1996 Leadership: Meeting Community Needs	Bill Brinton
1978 Strengthening the Family	Jacquelyn Bates	1997 Improving Public Dialogue	Jim Crooks
1979 Citizen Participation in the Schools	Susan Black	1997 Transportation for the Disadvantaged	Cathy Winterfield
1979 Youth Unemployment	Roy G. Green	1997 Children with Special Needs	Virginia Borrok
1979 Theatre Jacksonville	Richard Bizot	1998 The Role of Nonprofit Organizations	Sherry Magill
1979 Civil Service	Max K. Morris	1998 Incentives for Economic Development	Henry Thomas
1979 Planning in Local Government	I. M. Sulzbacher	1999 Improving Adult Literacy	Edythe Abdullah
1980 Capital Improvements for Recreation	Ted Pappas	1999 Arts, Recreation and Culture in Jacksonville	Ed Hearle
1980 But Not In My Neighborhood	Pamela Y. Paul		
1980 The Energy Efficient City	Roderick M. Nicol	2000 Affordable Housing	Bill Bishop
1981 Coordination of Human Services	Pat Hannan	2000 Improving Regional Cooperation	Jim Rinaman
1981 Higher Education	R. P. T. Young	2001 Services for Ex-Offenders	Dana Ferrell
1982 Disaster Preparedness	Walter Williams Jr.		Birchfield
1982 Teenage Pregnancy	Mari Terbrueggen	2001 Growth Management Revisited	Allan T. Geiger
1982 Downtown Derelicts	Earle Traynham	2002 Making Jacksonville a Clean City	Brenna Durden
1983 Mass Transit	David Hastings	2002 Beyond the Talk: Improving Race Relations	Bruce Barcelo & Brian Davis
1983 Indigent Health	Care Linda McClintock	2003 Neighborhoods at the Tipping Point	Randy Evans
1984 Jacksonville's Jail	Eleanor Gay	2003 Public Education Reform: Assessing Progress	J.F. Bryan IV
1984 Growth Management	Curtis L. McCray	2004 Town & Gown: Building Successful University-Community Collaborations	Audrey McKibbin
1985 Visual Pollution	Doug Milne	2004 Public Education Reform: Eliminating the Achievement Gap	Moran
1985 Minority Business	Jack Gaillard	2005 River Dance: Putting the River in River City	Bill Mason
1986 Private Delivery of Public Services	George Fisher	2006 Attracting and Retaining Talent: People and Jobs for the 21st Century	Ted Pappas
1986 Mental Health and Drug Abuse Services for Children and Youth	Flo Nell Ozell		Adrienne Conrad
1987 Child Day-Care Services	George W. Corrick		
1987 Infrastructure	Joan Carver		
1988 Local Election Process	Jim Rinaman		
1988 School Dropout Prevention	Gene Parks		
1989 Reducing the Garbage Burden	Jack F. Milne & James L. White III		
	Roseanne Hartwell		
1989 Independent Living for the Elderly	Yank D. Coble Jr.		
1990 Future Workforce Needs	Juliette Mason		
1990 Philanthropy in Jacksonville	Russell B. Newton Jr.		
1991 Adequate Water Supply	Henry H. "Tip" Graham		
1991 Positive Development of Jacksonville's Children			
1992 Long-Term Financial Health of the City of Jacksonville	Mary Alice Phelan		
1992 Young Black Males	Chester A. Aikens & William E. Scheu		
1993 Planning for Northeast Florida's Uncertain Military Future	David L. Williams		
1993 Public Education: The Cost of Quality	Royce Lyles		
1994 Reducing Violence in Jacksonville Schools	Dale Clifford		
1994 Jacksonville Public Services: Meeting Neighborhood Needs	Michael Korn		
1995 Teenage Single Parents and their Families	Afesa Adams		

***JCCI studies may be downloaded from  
our website at [www.jcci.org](http://www.jcci.org)***

### ***About JCCI***

*Like every city, Jacksonville has its challenges and determining how to face those challenges is the role of JCCI. Every day, JCCI brings people together to learn about pressing issues in our community and to find solutions. All with the goal of making Jacksonville a great place to live. JCCI...citizens building a better community.*

### ***JCCI Studies***

*Each year, citizen volunteers and JCCI committees identify problems facing our city. With their input, issues are selected to become the subject of in-depth study. Committees, made up of ordinary citizens, meet weekly for six months to unravel the causes of a problem and make recommendations to resolve it. When the study is published, a JCCI volunteer task force presents it to the community at large, to government, to businesses and others advocating for the changes the study recommendations. Since 1975, decision-makers have given these studies the consideration they deserve and taken action to make our area a better place for all residents.*

## **Ways to Reduce Individual Energy Use Make Conscious Choices**

**There are many more energy-saving ideas; check on-line sources**

### **At Home:**

- Buy Less; Reduce Consumption
- Choose filtered water over bottled water (less plastic, less petroleum use)
- Don't use aerosol sprays
- Let live houseplants help purify indoor air
- Open the windows more often—use less heat and AC
- Install ceiling fans
- Dress in layers to avoid higher heating in winter
- Use fans to avoid lowering the AC thermostat
- Use cloth napkins and recycled paper products
- Use compact fluorescent in place of incandescent light bulbs
- Install a programmable thermostat that decreases use when not at home
- Turn off lights and unplug stand-by appliances.
- Change AC filters monthly
- Insulate water heater
- Consider a solar water heater
- Choose Energy Star-rated appliances
- Choose solar outdoor lights
- Turn off or unplug lights and appliances including battery chargers when not in use
- Get an energy audit
- Select dishwasher's no-heat or air-drying cycle
- Clean refrigerator coils and maintain gaskets
- Avoid over-drying clothes
- Wash and rinse clothes in cold water
- Capture rainwater for your garden
- Limit use of gas-powered mowers, consider planting groundcover instead of grass
- Plant shade trees around the house

### **At the Office:**

- Turn off lights whenever you leave a room
- Program computer to "sleep" after 30 minutes of nonuse
- Turn off computer if leaving it for more than 30 minutes
- Unplug surge protector which draws energy when the computer is off
- Turn off monitors after 20 minutes of nonuse

### **In your Automobile:**

- Keep tires inflated and get regular tune-ups to increase gas mileage
- Carpool, ride share, use public transportation, bike to work
- Avoid excessive idling—better to turn engine off than let it idle for more than 1 minute
- Avoid aggressive driving—it can lower gas mileage up to 33% on highways, 5% in-town speeds
- Organize trips for efficiency of road-miles

### **Vote with Your Dollars:**

- Take your own cloth bags to the grocery store—not paper or plastic
- Shop locally—local craftspeople, local produce—to use less fossil fuel for transportation
- When possible, shop local over big-box retailers to reduce delivery miles and energy use



*THIS STUDY IS PRINTED ON RECYCLED PAPER*

This study was funded by the  
City of Jacksonville, sponsored by  
The Law Firm of Pajcic & Pajcic,  
and supported by the Jacksonville community.

THE LAW FIRM OF  
**Pajcic & Pajcic**



Jacksonville Community Council Inc.  
2434 Atlantic Boulevard, Suite 100  
Jacksonville, Florida 32207-3564  
Phone: 904.396.3052 Fax: 904.398.1469  
Email: [mail@jcci.org](mailto:mail@jcci.org)  
[www.jcci.org](http://www.jcci.org)

