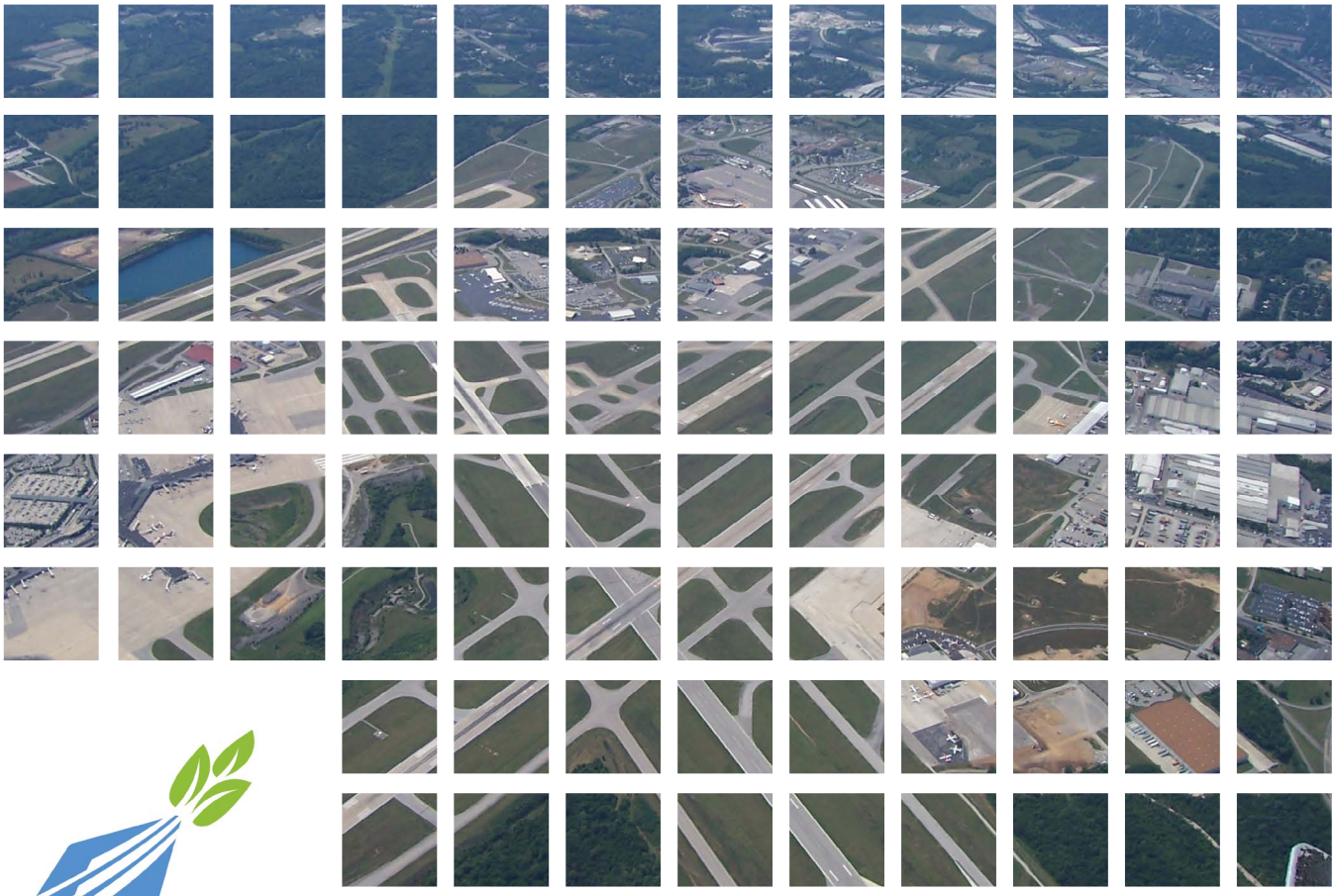
October 2012

Nashville

International Airport **Sustainability Study**

Highlights



Sustainability Study

Sustain the heartbeat of the Mid-South by cherishing its resources to ensure Music City keeps flying high

ENHANCING THE NASHVILLE
AIRPORTS EXPERIENCE

Metropolitan Nashville Airport Authority℠

A Six Sigma Organization

NASHVILLE INTERNATIONAL AIRPORT | Sustainability Study Highlights

Acknowledgements

The consultant team worked directly with Metropolitan Nashville Airport Authority's (MNAA) Planning, Design & Construction (PDC) staff in the development of this study. The consultant team would also like to thank the following individuals and groups for their valuable input and participation on this project:

- MNAA Executive Leadership – current President/CEO Rob Wigington and former President/CEO Raul Regalado
- MNAA Sustainability Committee
- Federal Aviation Administration (FAA) Southern Region and Memphis Airports District Office
- Nashville International Airport (BNA) Master Plan Update Team
- BNA Master Plan Update Technical Advisory Committee and Community Advisory Committee
- BNA tenants

This sustainability plan was prepared for the Metropolitan Nashville Airport Authority by a consultant team led by Vanasse Hangen Brustlin, Inc. (VHB):

Vanasse Hangen Brustlin, Inc. | www.vhb.com

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COVER:
Aerial photograph of Nashville International Airport

NASHVILLE

International Airport **Sustainability Study**

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The Nashville Airports Experience (NAE)

As MNAA's core competency, the Nashville Airports Experience (NAE) is all about providing great airports for our passengers and guests, our business partners and our fellow employees. NAE involves going above and beyond expectations to provide outstanding customer service.

NASHVILLE

International Airport **Sustainability Study**

The Metropolitan Nashville Airport Authority (MNAA) is the owner and operator of Nashville International Airport (BNA) and John C. Tune Airport (JWN). In 2010, MNAA commissioned a Sustainability Study for BNA and was selected as one of only 10 airports in the U.S. to take part in the Federal Aviation Administration's (FAA's) *Sustainable Master Plan Pilot Program*.[1] FAA selected MNAA for the Program because of its leadership in implementing sustainability initiatives, such as projects that promote water conservation, energy efficiency, social well-being, and community involvement at BNA.

Through this sustainability study, MNAA has committed to a long-term, comprehensive, and integrated perspective that considers the natural environment, community interests, economic factors as well as operational efficiency. This approach will sustain the Nashville Airports Experience for years to come.

1 **http://www.faa.gov/airports/environmental/sustainability**

What is Sustainability?

Sustainability has redefined the values and criteria for measuring organizational success by using a "triple bottom line" approach that considers economic, ecological and social well-being. Applying this approach to decision-making is a practical way to optimize economic, environmental and social capital. MNAA is taking a broad view of sustainability that builds on the concept of the triple bottom line, and considers the airport-specific context. Consistent with the Airports Council International - North America's (ACI-NA) definition of *Airport Sustainability*,[2] MNAA is focused on a holistic approach to managing its airport to ensure **E**conomic viability, **O**perational efficiency, **N**atural resource conservation, and **S**ocial responsibility (EONS).

A key principle of sustainability is recognizing that addressing one concern does not necessarily come at the expense of another. Optimally, evaluating a project or activity based on environmental and social concerns will spur innovation that ultimately reduces costs over the life of the project.

Airport sustainability as part of a business strategy has both immediate and long-term benefits that can be measured and when persistently managed, present rewards. Some benefits of sustainability initiatives that have been demonstrated at airports across the world include:

- Improved passenger experience
- Better use of assets
- Reduced development and/or operations and maintenance costs
- Reduced environmental footprints
- Facilitation of environmental approvals/ permitting
- Improved relationships within the community
- Enhancement of the regional economy
- Creation of an engaged and enriched place to work
- Creation of new technologies through increased demand and investment in technologies that facilitate sustainable solutions

FAA's Sustainable Master Plan Pilot Program

FAA's objective is to make sustainability a core objective in airport planning. The pilot program, which began in 2010, involves funding long-range planning documents at airports throughout the U.S. including the BNA Sustainability Study. FAA will use the study as a model for conducting sustainability planning at other airports nationwide, continuing MNAA's tradition of leading the airport industry in innovative practices.

Find more information at:
www.faa.gov/airports/environmental/sustainability

2 **http://www.sustainableaviation.org/pdfs/ACC%2520-%2520Sustainability%2520White%2520Paper.pdf**

Managing Sustainability at BNA

MNAA fosters a culture of continuous improvement and sustainability throughout the organization. Sustainability at BNA is viewed in the context of its existing planning and organizational management processes. MNAA has already developed goals, objectives and performance tracking mechanisms, and identified implementation strategies in many of its existing management processes, which are shown in the figure below. This study is using the established organizational and managerial processes as a framework on which to build the sustainability planning effort.

> MNAA seeks organizational sustainability by managing and growing BNA and JWN airports so as to ensure the integrity of the economic viability, operational efficiency, natural resource conservation, and social responsibility of the airport.
>
> ~ MNAA Performance Excellence 2011 Application to the nonprofit Tennessee Center for Performance Excellence (TNCPE)

Key MNAA Management Processes and Sustainability

Source: MNAA, 2011.

DMAIC = Design, Measure, Analyze, Improve, Control
PDCA = Plan, Do, Check & Act
CALEA = Commission on Accreditation of Law Enforcement Agencies

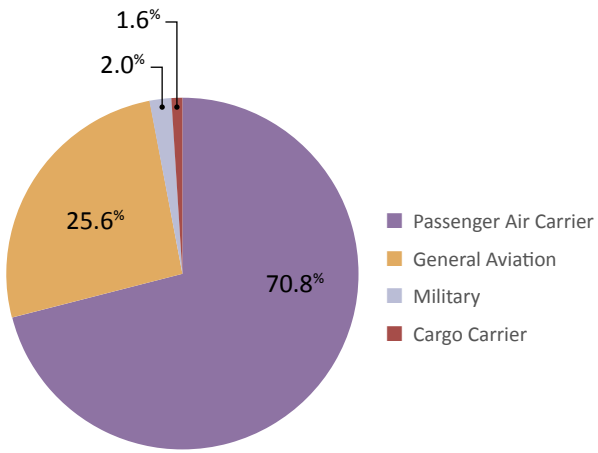
Berry Field in 1946.
Source: MNAA

Nashville International Airport in 2012.
Source: Google

Profile of Nashville International Airport

75 YEARS since first opening, the airport has grown to become a major economic engine in the region, generating $3.7 billion in regional economic activity, nearly $1.2 billion in wages and approximately 39,540 jobs annually.[3] BNA is located on approximately 4,500 acres and has four runways that accommodated 174,994 aircraft operations and 4,806,092 departing passengers in 2011. The Airport is primarily used by passenger airlines, followed by general aviation (private, unscheduled aircraft). Military (Tennessee Air National Guard) and air cargo operate at BNA much less frequently.

Types of Operators at BNA (2011)



3 Wilbur Smith Associates, The Economic Impacts of MNAA Airports, November 1, 2007.

Nashville International Airport Snapshot

FAA-defined Role in National Airport System:
Commercial Service – Primary, Medium Hub

Airport Area:
4,500 acres

Runways:
13/31 (11,029 feet)
2R/20L (8,000 feet)
2C/20C (8,000 feet)
2L/20R (7,703 feet)

Based Aircraft (2011)
110[1]

Annual Operations (2011)
174,598[2]

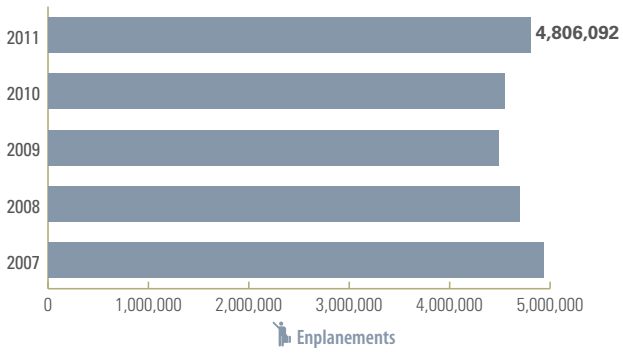
Total Tenants
100+

Total MNAA staff
280 employees

Major Tenants
Air Carriers
FAA
Tennessee Air National Guard
Fixed-Base Operators (FBOs)
Concessions

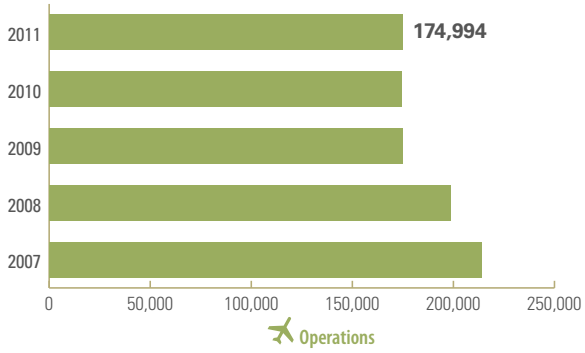
Sources:
1 Airport Master Record (Form 5010), 2012.
2 **http://www.nashintl.com/about/data.aspx, 2012.**

Passenger Enplanements and Aircraft Operations



Note:
Enplanements are the total number of passengers departing on flights from BNA

Source: MNAA, 2012

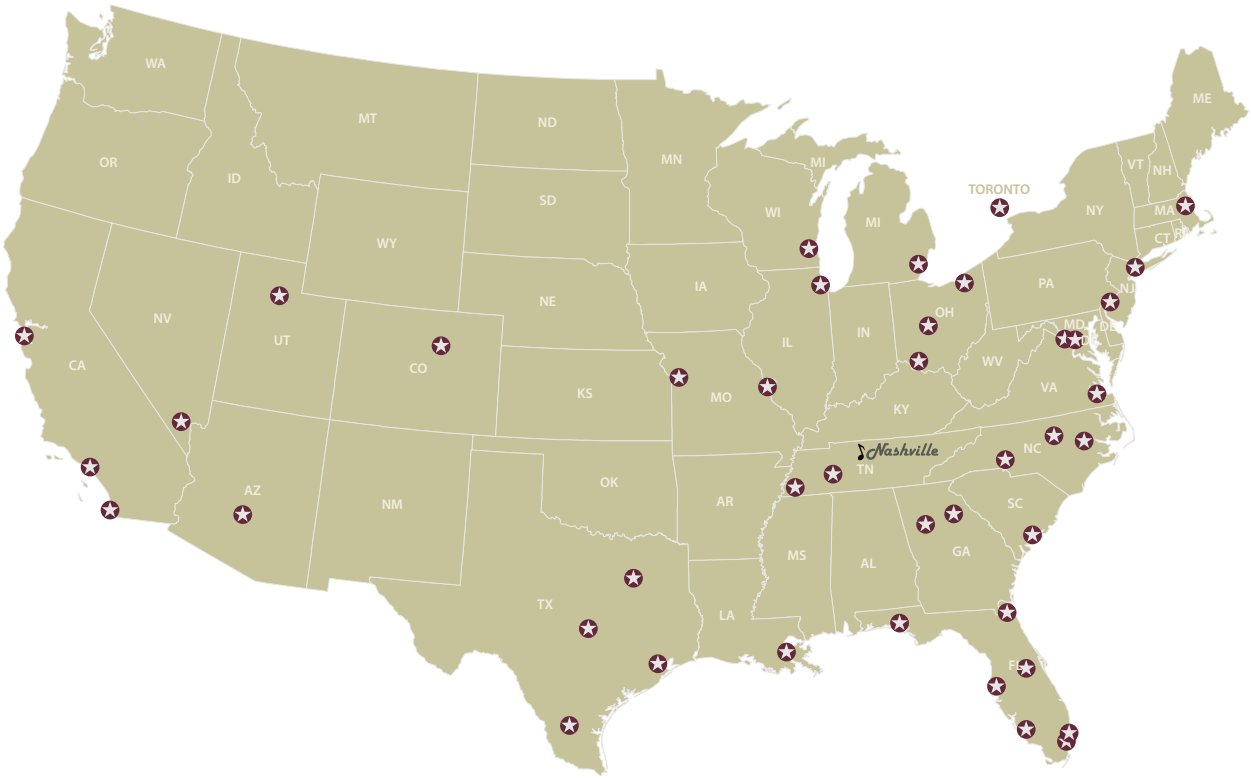


Note:
An aircraft operation is an arrival or a departure

Source: MNAA, 2012

The number of aircraft operations (arrivals and departures) at BNA peaked in 2004 and dropped through 2010. This drop in aircraft operations was reflected nationwide due to poor economic conditions, use of larger aircraft, and reduction of flights by airlines. Operational activity at BNA has remained stable since 2010, with a decrease in air carrier operations but an increase in general aviation activity.

Though aircraft operations have declined at BNA, passenger enplanements peaked in 2007 and have increased continually since 2009. The recent increase in passenger activity levels is a reflection of higher load factors on airline flights (percentage of seats filled with paying passengers) and BNA's growing role as a connection point for airline passengers (primarily flying Southwest Airlines). BNA currently ranks as the 35th busiest airport in the U.S. and the 4th fastest growing airport among the top 75 airports in the U.S.



As of October 2012, airlines at BNA provided 380 daily flights and non-stop scheduled passenger service to 46 airports in the U.S. and Canada.

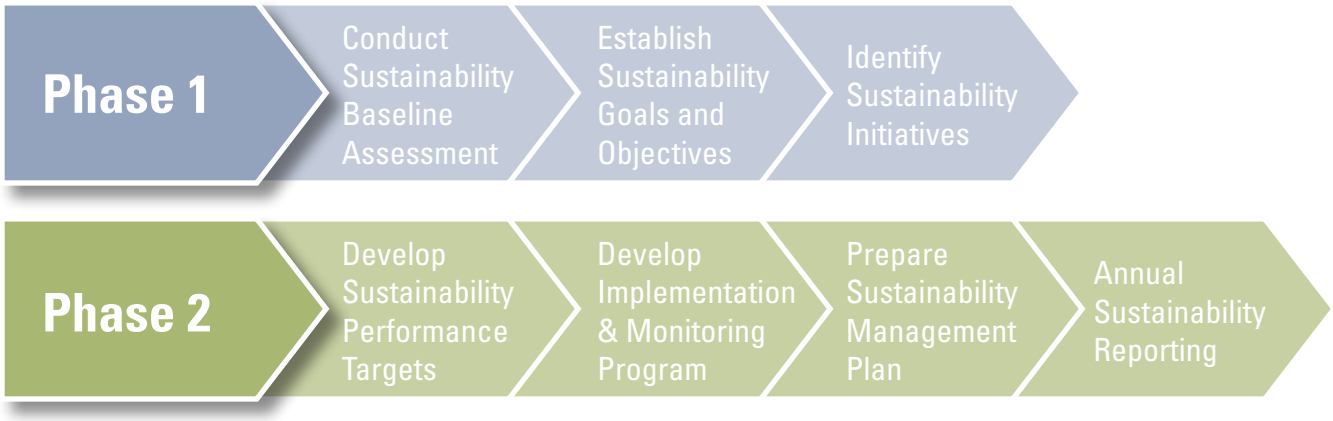
Source: MNAA, **www.nashintl.com/flight_info/cities.aspx**

Note: Some flight destinations change depending on the season

BNA Sustainability Study Planning Process

Because sustainability, airport planning, and design practices are continuously evolving, the planning process must allow airports to capture new trends and initiatives based upon the airport's current and ultimate goals. An airport's definition of sustainability should reflect its particular circumstances and role within its community, while also incorporating both stakeholder and local needs. The planning process used in this study provided flexibility for MNAA to consider BNA's operating environment, resources, and stakeholder goals.

This Sustainability Study process was a 16-month effort, conducted in two phases, each with significant steps.



The planning process consisted of two phases and set the groundwork for a Plan-Do-Check-Act cycle of continual improvement. Phase 1 focused on establishing sustainability goals and objectives based on the airport's current performance, activities, and resource consumption, then identifying initiatives to help MNAA meet those goals.

Phase 2 focused on developing the framework for implementation and continual improvement through monitoring and reporting, including the development of sustainability performance targets to help the airport make regular progress towards achieving its sustainability goals. The reporting process is structured to ensure continual improvement by revisiting goals and objectives at each reporting interval, and re-evaluating performance through ongoing tracking.

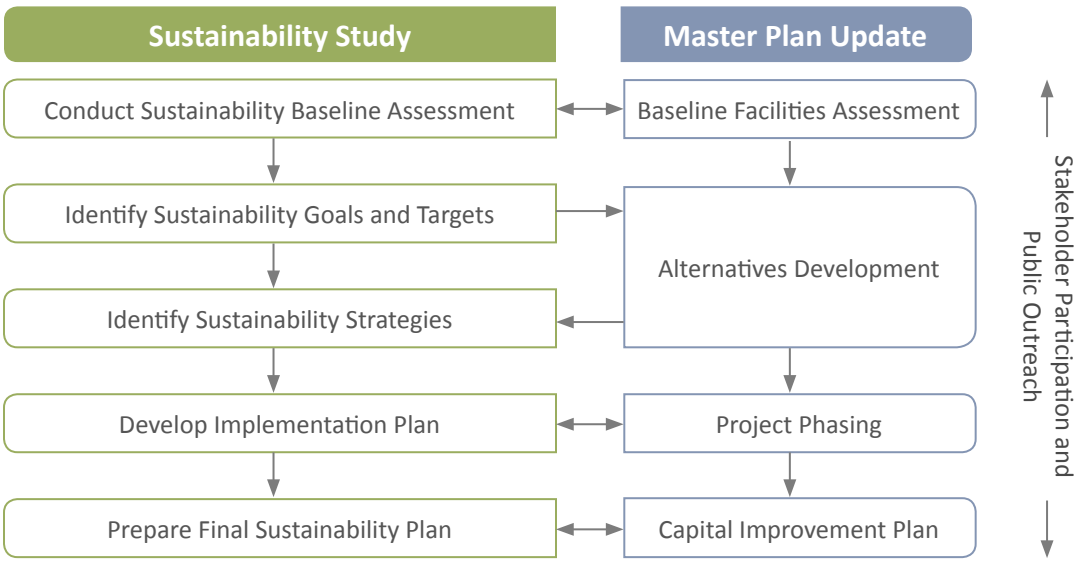
Integration with the Master Plan Update

Concurrent with the Sustainability Study, MNAA is also conducting a Master Plan Update for BNA,[4] which will guide the development of the Airport for the next 20 years. The two planning projects complement each other by sharing information and data where applicable, combining stakeholder outreach efforts, and creating a long-term development vision for the Airport that considers economic, environmental, social and operational factors. The coordination between the two projects are shown in the following figure.

4 BNA Master Plan Update 2012, **http://www.nashintl.com/about/masterplan.aspx**

BNA Sustainability Study and Master Plan Update Planning Processes

Source: VHB, 2012.



Sustainability Mission Statement

The VHB Team coordinated with MNAA staff and its Sustainability Committee to develop a sustainability policy/mission statement that is consistent with MNAA's overall airport mission statement. The mission statement has provided the context for MNAA's approach to sustainability and was considered when developing sustainability goals and objectives for this plan. The Sustainability Committee developed the following sustainability mission statement:

To sustain the heartbeat of the Mid-South by cherishing its resources to ensure Music City keeps flying high

BNA's Sustainability Committee: Guiding the Sustainability Planning Process

MNAA's Sustainability Committee aided in forming the context for sustainability at BNA and identified key issues for consideration in the sustainability study, such as:

- Management's commitment to sustainability.
- Integration of other management plans and policies into the sustainability framework.
- Identification of relevant focus areas for sustainability goals and objectives.

What is MNAA's Current Sustainability Performance?

The sustainability baseline assessment focused on collecting readily available baseline information, calculating and compiling current rates of resource consumption, and identifying sustainability opportunities and challenges in eight key areas:

- Passenger Terminal Energy Efficiency
- Materials Management
- Natural Resources Conservation
- Socioeconomic and Community Support
- Air Quality and Greenhouse Gas (GHG) Emissions
- Surface Transportation
- Aircraft Noise

Understanding current sustainability performance enables MNAA to evaluate the impact (relative to current performance) of sustainability initiatives implemented in the future. MNAA has implemented a number of sustainability initiatives in each of these key areas – from the design and construction of the recently completed consolidated rental car facility (CONRAC) to sponsorship of local public schools. The sections below present an overview of BNA baseline sustainability performance as well as a detailed list of sustainability initiatives currently in place at the Airport.

Terminal lighting accounts for 18.4% of electricity use at BNA; to minimize this electricity use, MNAA incorporates natural daylight through large windows and skylights placed throughout the terminal.

Passenger Terminal Energy Efficiency

Airport passenger terminals use large amounts of energy for lighting, heating, ventilation, air conditioning, and conveyance systems. Within the U.S., airport passenger terminal buildings typically account for 40% of all electrical energy used at an airport.[5] Not only is enhancing energy efficiency of facilities important for conserving natural resources, it also conserves valuable financial resources. In fiscal year 2011, MNAA spent 9.7% of its total operating expenses on communications and utilities (which include energy costs) compared to 8.9% by all medium hub airports in the U.S.[6]

Due to the amount of financial resources spent on energy at MNAA's largest building - the BNA main passenger terminal building - and MNAA's desire to enhance energy efficiency, a separate energy evaluation was conducted as part of this Sustainability Study. This energy evaluation was performed to identify and evaluate opportunities for improvements to the building's mechanical and electrical equipment and systems in order to reduce energy consumption and GHG emissions.

BNA is on a seasonal rate structure for electricity purchases, but will be switching to a time-of-day rate structure. This change in rate structure will translate to increased savings associated with reductions in energy use during peak load times, and provides the airport with an incentive to pursue measures to shift its electricity use from peak hours to off-peak hours.

Current Energy Performance

BNA receives electric service from the Nashville Electric Service (NES) and natural gas service through Piedmont Natural Gas. Tenant energy use accounts for 25% of the BNA main passenger terminal's electricity usage. This electricity is sub-metered and billed to individual tenants. The adjacent figure shows the major

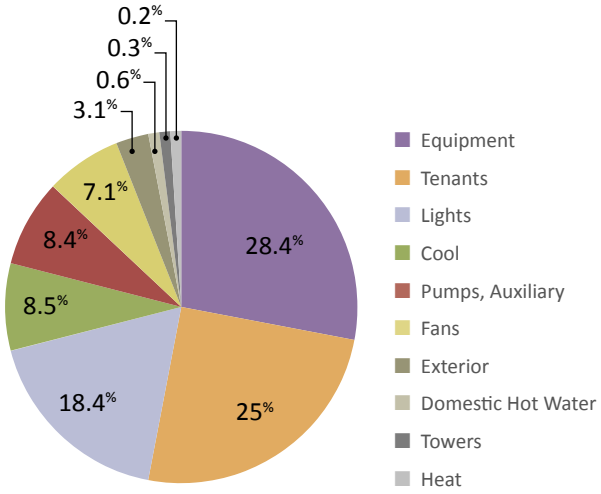
5 Transportation Research Board (TRB), Airport Cooperative Research Program (ACRP) Synthesis 21: Airport Energy Efficiency and Cost Reduction, 2010.

6 Federal Aviation Administration, AAS-400, CATS, Report Form 5100-127.

end uses in the BNA main passenger terminal. The energy evaluation focused on the HVAC equipment including the central plant, which in total accounts for over a quarter of the overall electricity usage. The remaining energy usage consists of lighting and equipment, including people moving equipment, baggage equipment and office equipment.

Other energy uses not included in the above are airfield lighting and navigation aids, roadway and parking facility lighting and other ancillary uses at the airport. MNAA has analyzed these areas as separate airport projects to identify opportunities for energy efficiency upgrades.

BNA Main Passenger Terminal Electricity End-Use Breakdown



Current Building Energy Efficiency Activities

The following existing energy efficiency measures were identified during the course of the energy evaluation.

Building Energy Efficiency Initiatives	Sustainability Benefits
Terminal Building Improvements MNAA has implemented several enhancements to energy efficiency in the Terminal Building, including: • Lighting occupancy sensors in gate areas to turn off lights when the areas are unoccupied. • Daylighting sensors in gate waiting areas to turn off lights when there is sufficient daylight available. • Replacement of two-thirds of all original air handlers with more energy efficient units. • Replacement of central plant boilers, which provide heating hot water to the air handlers, with more efficient units. • Replacement of two original central plant constant speed chiller with a variable speed chiller, which provides chilled water to the air handlers (variable speed chillers provide significant energy savings over constant speed chillers). In addition, MNAA has implemented or is planning similar energy efficiency upgrades to other airport facilities, such as maintenance buildings, the Aircraft Rescue and Fire Fighting (ARFF) building, and the MNAA Property Corporation's International Plaza.	Reduces the overall amount of purchased electricity used to provide power and comfort air to the terminal areas, which results in a reduction in GHG emissions from MNAA facilities.
Energy Efficient Baggage Conveyor System MNAA has upgraded its baggage conveyor system to include variable frequency drives on motors as well as high-efficiency belts.	Reduces terminal electricity use, which also results in a reduction in GHG emissions from MNAA facilities.

Materials Management

Typical types of solid waste at airports include industrial, construction, and municipal solid waste. Materials that are recycled at BNA include paper, cardboard, aluminum, plastic and debris from maintenance and construction and demolition projects. MNAA contracts with a private waste management firm for disposal of non-recycled waste and the Metropolitan Nashville Department of Public Works Curby program for disposal of recycled materials.

BNA generated 2,203.24 tons of waste in 2010 (including tenant waste, but not including construction and demolition waste). Of the total waste, 161 tons were recycled, corresponding to a recycling rate of 7.31%. In 2011, MNAA recycled 190 tons of waste generated at BNA (data on total waste generated were not available). Although MNAA is ahead of many U.S airports that do not have recycling programs in place, a recycling rate below 10% is generally considered to be "low" for airports in North America. As a result of this finding, improving the rate of recycling at BNA has become a priority for MNAA.

To reduce waste, the airport provides recycling bins in the terminal and office areas. Recyclables collected in these areas included mixed cardboard, paper, metal cans, and plastics (1-7) in 2010. Glass recycling is not available as part of the Curby program; therefore, glass materials are not currently part of the recycling program at BNA.

Materials recycling is encouraged in all projects involving pavement repair/replacement/rehabilitation or new pavement installation, but MNAA does not have a formalized construction debris recycling policy. The total volume of non-construction-related materials recycled at BNA in 2010 was 321,760 pounds.

BNA has dedicated over 130 acres of land to accept fill from development projects in the area. The Airport currently has 12 tracts of land set aside, ranging from 6 to 13 acres each, for use as fill sites. This existing initiative not only assists local economic development, but it also helps reduce the air pollutant and GHG emissions associated with trucking fill to sites located further away, outside of the Nashville metropolitan area.

As an example, MNAA coordinated with contractors constructing the new Music City Center[7] that will replace the existing downtown convention center to provide a site to accommodate approximately 250,000 cubic yards of project fill. This coordination enabled the Music City Center project to deposit fill five miles closer to the construction site. The reduction in truck trip distances resulted in 38,850 fewer gallons of diesel fuel used (estimated $149,000 in avoided fuel costs) and approximately 389 metric tons of avoided GHG emissions. In addition, offering these fill sites saves MNAA money and reduces GHG emissions by avoiding the need to purchase and truck in fill from off-site, when needed for future development at BNA.

7 The Music City Center is being constructed on 16 acres in downtown Nashville and will include a 1.2 million square foot convention building facility. The facility is planned to open in 2013.

Southwest Airlines recycles newspapers and magazines retrieved from its aircraft and use the recycling bins (shown) at BNA, as part of its corporate recycling program. Other airlines also take advantage of the airport's recycling infra-structure.

Current Waste Reduction Activities

The following existing materials management measures have been implemented at BNA.

Waste Reduction Initiatives	Sustainability Benefits
Recycling	
MNAA actively recycles paper products, metal cans, plastic, lamps/lighting, tires, carpet and batteries.	Reduces waste disposed in landfills. Additionally, there may be minor financial benefits of selling recycling materials.
Coffee grounds saved for enhancement of soils around airport	
BNA saves coffee grounds used by concessionaires for use as soil conditioner on airport properties. Grounds not used by the airport have been made available for employees to take home for gardening.	Reduces waste disposed in landfills. Natural soil enhancement reduces the need for fertilizers.
MNAA reuses or recycles construction waste and recycles solid waste from passengers and tenants.	
MNAA considers reuse and recycling throughout airport projects. Concessions and airlines are encouraged to dispose of recyclable materials in the airport's recycling containers, including bailers for bulk cardboard. MNAA works with the Metropolitan Nashville Public Works "CURBY Program" to recycle materials collected from daily airport operations. BNA has compactors on-site to manage the single stream recycling operation for all recyclables and also uses a bailer to bundle large recyclable cardboard materials. There are recycling bins located throughout the airport in public and private office areas.	Reduces waste disposed in landfills. Reduces cost of fill for future projects (for example, concrete pavement recycling has been used to provide base stone under new pavement installation, or placed into permitted fill areas where future development is proposed to bring the area to grade and reduce the need for purchasing fill when future projects are undertaken).
Community-Dedicated Fill Sites	
MNAA has dedicated over 130 acres of land at BNA to accept clean fill from development projects in the local area. In total, the Airport currently has 12 tracts of land set aside for use as fill sites. The fill sites will be used at BNA when needed for future development.	Assists local economic development, such as the Music City Center. Reduces air and GHG emissions associated with trucking fill to sites located further away, outside of the Nashville metropolitan area.
Tenants Outreach	
MNAA provides concessions and airlines with a copy of BNA's recycling flyer and they are encouraged to dispose of recycling materials in the recycling compactors and other receptacles around the airport.	Increases recycling and promotes good waste management practices.
Establishment of an on-airport materials management facilitation area to reduce truck trips and hauling	
BNA has a formalized facilitation area where construction waste and recyclable materials are consolidated and sorted, prior to being trucked off-site to a recycling facility or waste disposal site.	Reduces air and GHG emissions associated with reduced trucking construction and demolition debris.

Natural Resources Conservation

The airport seeks to conserve natural resources, including wildlife, plants and water wherever possible. Management of on-airport natural resources is an area subject to numerous environmental regulations. These regulations relate to the quality of drinking water supplies, stormwater discharges to maintain the quality of surface water and wetlands, the protection of wetland areas, and minimization of hazardous wildlife attractants in the vicinity of the airport. There are limited sensitive land areas on airport property for which increased conservation efforts (beyond compliance) are necessary. BNA sources its drinking water from municipal supplies.

All of the BNA outfalls drain to one of three surface water streams, namely McCrory Creek, Sims Branch, and Mill Creek. McCrory Creek enters the Stones River and Sims Branch flows into Mill Creek. Both Mill Creek and the Stones River discharge to the Cumberland River.

The former Hoover Quarry is located east of Runway 2R/20L and covers approximately 43 acres. Located east of the airport, the quarry was originally constructed to extract limestone. Mining operations ceased in 1988, and the quarry has since come to serve as a stormwater retention pond. In March 2008, the average water depth was approximately 205 feet, with a maximum depth of approximately 285 feet.

The *Orconectes Shoupi* (Nashville Crayfish) is listed as an endangered species located in the area. While none are known to exist on airport property, Mill Creek and Sims Branch (adjacent waterways downstream of BNA) both provide habitat for the Nashville Crayfish.

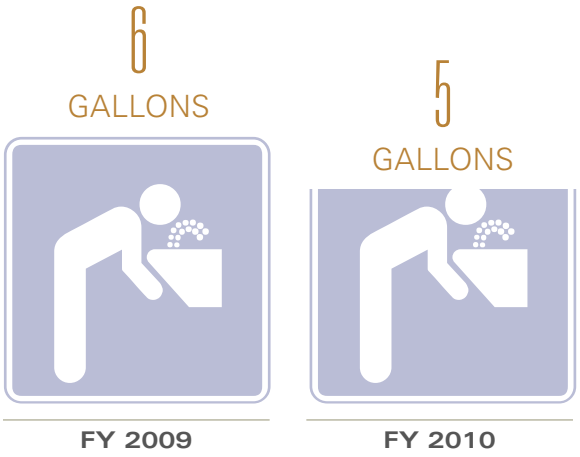
The airport conserves and protects these resources through several activities:

- Management of aircraft deicing activities
- Development and implementation of a wildlife management plan
- A Landscaping Master Plan to manage landscape/irrigation practices
- Stormwater treatment system
- Metering of potable water use

Current Natural Resource Conservation Performance

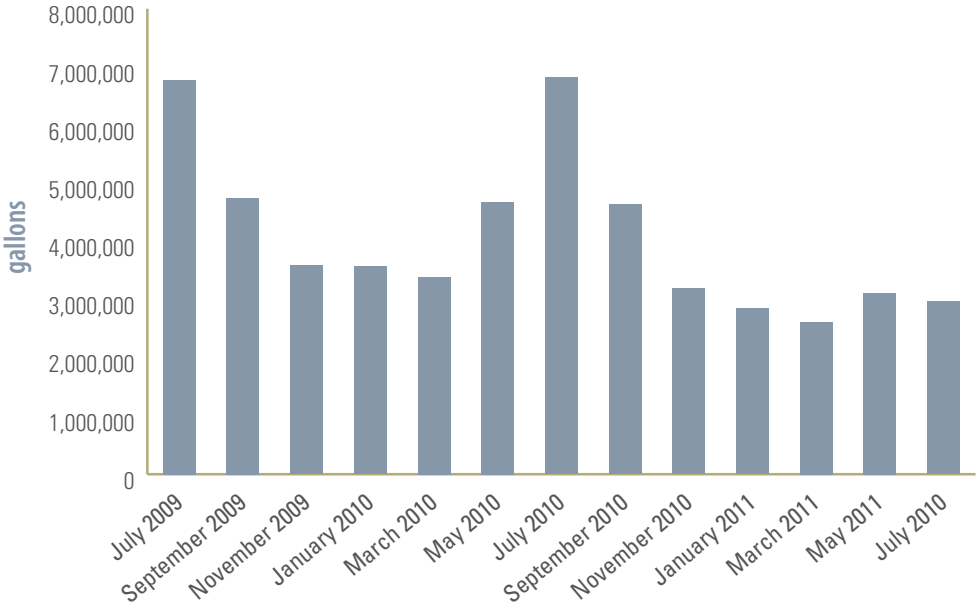
Overall, airport water use decreased by 17.5%, from 53,303,976 gallons in FY 2009 to 43,971,180 gallons in FY 2010. This decrease corresponds to a decrease of 5.95 to 4.88 gallons per passenger.

Annual Potable Water Use
(gallons per passenger)



Monthly water usage data (as shown in the figure below) indicates that the most water-intensive months are during the summer, when water demands for irrigation are at their highest, from May through September, with water use peaking in July. However, summer of 2011 showed a substantial reduction in water use compared to previous years.

Monthly Airport Water Use



Current Natural Resource Conservation Activities

The following existing natural resource conservation measures have been implemented at BNA.

Natural Resources Conservation Initiatives	Sustainability Benefits
Water Efficiency in Buildings	
Restrooms at the airport have motion detector faucets and toilets. In addition, the recent terminal renovation included equipping restrooms with low-flow fixtures.	These improvements enhance the efficiency of the systems and reduce water use in the airport terminal.
Water Efficient Landscaping	
MNAA implements "green" landscape design wherever possible and utilizes timers on the irrigation system.	Limits the amount of irrigation and fertilizer needed.
Water Reuse	
BNA and the rental car agencies use reclaimed water for washing rental cars in the new CONRAC facility.	Reduces potable water consumption.

Socioeconomic and Community Support

MNAA generates more than $3.7 billion in regional economic activity, contributing nearly $1.2 billion in wages and approximately 39,700 jobs annually to the regional economy.[8] Employees working at BNA make the airport the 10th largest workplace in the region. In addition to fulfilling its role as an economic engine for the area, MNAA strives to have a positive impact on the surrounding community and Nashville metropolitan area through various activities including:

- Ensuring that its business partners and workforce reflect the makeup of the community,
- Sponsoring local public school activities,
- Providing a showcase for local artists,
- Offering jobs with competitive pay, and
- Partnering with local charities.

MNAA also seeks to engage its employees and strives for employee satisfaction. MNAA initiatives targeted at employees include both mandatory and voluntary activities, such as general and job-specific training, an employee wellness program, and leadership development.

Current Socioeconomic and Community Support Performance

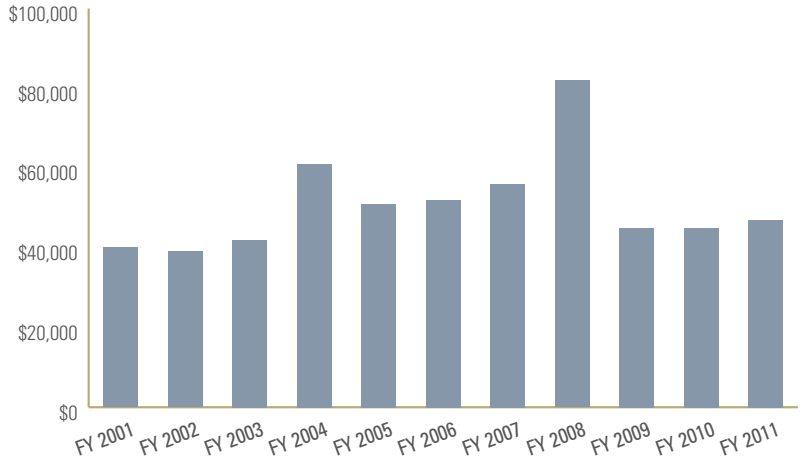
MNAA has consistently and generously supported local causes as shown in the following figure *MNAA Community Support*. MNAA has funded various sponsorships totaling $565,900 between fiscal years 2000 and 2011, including an estimated $47,700 in fiscal year 2011. Some of the local organizations that MNAA supports include the FiftyForward Donelson Senior Center (formerly Donelson Hermitage Senior Citizen Center), American Red Cross, and PENCIL Foundation.

As a result of MNAA's proactive business diversity program and recent significant capital investments, the involvement of small, minority, and woman-owned businesses enterprises (SMWBEs) and disadvantaged business enterprises (DBEs) on MNAA projects has steadily increased since 2007, as shown in the figure *Non-Federal MNAA Capital Improvement Program Expenditures to SMWBEs*.

8 Wilbur Smith Associates, The Economic Impacts of MNAA Airports, November 1, 2007.

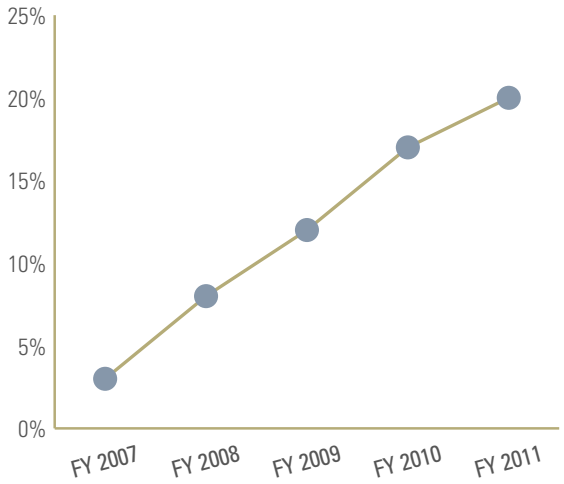
MNAA Community Support

Source: MNAA, 2011.



Non-Federal MNAA Capital Improvement Program Expenditures to SMWBEs

Source: MNAA, 2011 Annual Report.



Socioeconomic and Community Support Activities

Some highlights of MNAA's community involvement efforts include the Arts at the Airport program, business diversity development and local school sponsorships and support.

Socioeconomic and Community Support Initiatives	Sustainability Benefits
Business Diversity Development MNAA's Office of Business Diversity Development serves as a resource for small or disadvantaged businesses toward obtaining disadvantaged business enterprise (DBE) and small, minority and woman-owned business enterprise (SMWBE) certifications and providing guidance about contracting opportunities at both MNAA airports, and recently initiated "How to do Business With MNAA" workshops in surrounding counties, as well as the annual Bridges to Opportunity Program. In addition, MNAA offers technical expertise to small businesses through Mentor-Protégé and Emerging Contractor Programs.	Promotes business diversity and results in economic growth in the local community.
Community Leadership Training MNAA's development and learning system for MNAA leaders addresses the development of personal leadership attributes and organizational knowledge through Leadership Donelson-Hermitage and other programs. Leadership Donelson-Hermitage is a program that develops leadership skills, teamwork, and group development training through retreats, class projects and volunteerism.	Valuable leadership training while connecting to the local community.
Local School Sponsorships and Support MNAA has been active in Metro Nashville Public Schools through the Project PENCIL Partner program with Donelson Middle School, the STEM* (Science, Technology, Engineering and Math) program, and tours to schools and community organizations.	In addition to general benefits that result in positive interactions with the community, these programs expose students to the airport industry and may foster the next generation of airport leaders.
Training Training programs provided for employees through MNAA's Workforce Capability & Capacity process are both general and job-specific in nature. Some are mandatory, based on organizational and regulatory requirements. Upon completion of all training sessions, employees are provided an opportunity to anonymously evaluate the training through a feedback survey. The survey results provide staff an opportunity to integrate employee feedback into the training process.	Employee engagement and satisfaction.

Socioeconomic and Community Support Initiatives	Sustainability Benefits
Employee Wellness Program	
MNAA's wellness program, "Wellness on Wings," is an extension of employee benefits assisted by its Wellness Committee. MNAA partnered with the Vanderbilt University Dayani Center for Health & Wellness (Dayani Center) to provide a total wellness program. Annual health screenings, as well as coaching/counseling, are provided to employees. "Lunch and learn" seminars are periodically presented; recent topics have included nutrition, healthy meal planning, and understanding your Body Mass Index. Through its partnership with the Dayani Center, MNAA currently provides an online wellness tool that provides a customer-friendly means for employees to set, track, and achieve personal health and fitness goals.	Healthier employees, resulting in lower absenteeism rate and lower health care costs.
Leadership Roadmap	
MNAA's Leadership Roadmap helps employees develop their career paths and furthers MNAA's sustainability through succession and contingency planning. The Roadmap identifies various training, certifications, and other industry-related actions that should be obtained for executive staff, senior staff, and managers.	Enhances employee retention and potential advancement within the organization.
"Arts at the Airport" program	
MNAA's award-winning Arts at the Airport program features the region's visual and performing arts throughout the main passenger terminal. In addition to visual arts, BNA hosts local musical talent.	The enjoyment and enrichment of passengers and visitors, adding to the Nashville Airports Experience.

* Tennessee actively supports STEM Education. STEM classrooms offer a curriculum that is integrated, emphasize questioning and inquiry, and give students frequent opportunities to apply engineering design and problem-solving. **(www.stemresources.com)**

BNA Terminal Artwork, *The Art of the Lost Boys of Sudan*

Air Quality and Greenhouse Gas (GHG) Emissions

As part of this Sustainability Study, MNAA commissioned an inventory of air pollutants and GHGs emitted at BNA in 2011. Emissions at BNA are primarily from the combustion of fossil fuels (e.g., jet fuel, aviation gasoline, diesel, motor gasoline, natural gas).

Historically, Metropolitan Nashville-Davidson County (where BNA is located) has been considered in non-attainment of the U.S. Environmental Protection Agency's (EPA) one-hour National Ambient Air Quality Standards (NAAQS) previously established for Ozone (O_3) as well as the NAAQS for Carbon Monoxide (CO). In 1996 and 1990, O_3 and CO, respectively, were re-designated to "maintenance" of these standards, meaning that measures taken to enhance air quality have been successful, although continued monitoring is required. Recent data indicates Nashville may be close to non-attainment.

In addition to EPA's criteria pollutants (see box), the 2011 emissions inventory also included emissions of greenhouse gases (GHG) - carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), expressed in terms of carbon dioxide equivalent emissions (CO_2e).[9]

How does EPA Regulate Air Quality?

Under the Clean Air Act, the EPA is charged with establishing the NAAQS for pollutants that have a detrimental effect on outdoor air quality in terms of public health and environmental quality. EPA and its state-level affiliates record and evaluate air monitoring data to ensure areas of the nation are either in compliance (i.e., attainment) with or in violation (i.e. non-attainment) of these NAAQS.

What Pollutants does EPA Regulate?

EPA regulates air pollutants commonly found across the United States. These pollutants (known as "criteria pollutants") are used as indicators of air quality and include:

- CO (carbon monoxide)
- O_3 (ozone)
- PM_{10} (respirable particulate matter measuring 10 micrometers or less in diameter)
- $PM_{2.5}$ (fine particulate matter measuring 2.5 micrometers or less in diameter)
- SO_x (sulfur oxides)
- NO_x (nitrogen oxides)

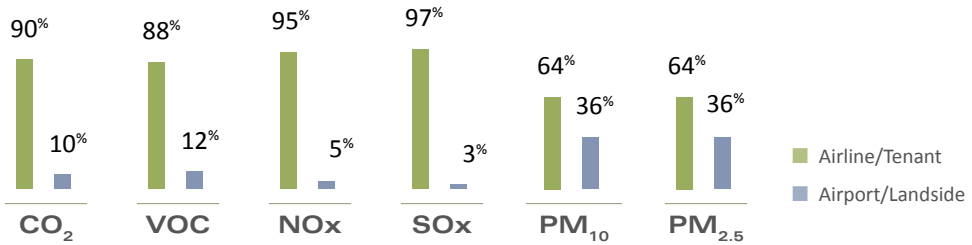
Current Air Pollutant and GHG Emissions Performance

Current air pollutant and GHG emissions are presented as the results of the inventory analyses for criteria pollutants and GHGs. The majority of criteria pollutant emissions at BNA are generated from airline/tenant operations. As depicted in the graph below, the airport/landside operations contribute minimally to emissions; airlines and tenants contribute the remainder of the emissions at the airport.

9 The expression CO_2e normalizes the warming effects of individual GHG to the warming potential of CO_2. Consistent with current Intergovernmental Panel on Climate Change (IPCC) guidelines, CH_4 and N_2O are considered 25 and 298 times as potent as CO_2, respectively, although they are emitted in much smaller quantities compared to overall CO_2 emissions.

2011 Air Pollutant Emissions – Percent Contribution by Airline/Tenant and Airport/Landside

Source: KB Environmental Sciences, 2011.



The adjacent figure presents CY 2011 GHG emissions by percentage of ownership and boundary category (scope); the three scope categories are described below. The airport/landside operations only contribute 4.6% of GHG emissions (Scope 1 and 2).

Consistent with the industry-recognized Transportation Research Board Airport Cooperative Research Program (TRB/ACRP) *guidelines for preparing GHG emissions*,[10] emissions reporting "boundaries" have been established according to the following categories:

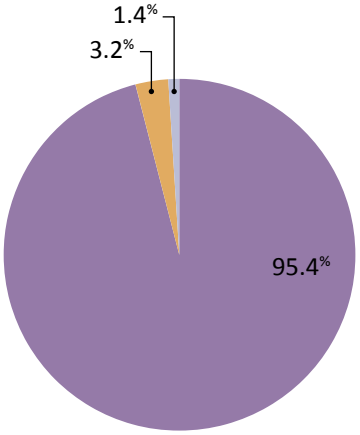
Scope 1 - Direct GHG emissions are from sources that are owned and controlled by the reporting entity (MNAA). These include airport owned and controlled stationary sources (e.g., boilers, emergency generators) and vehicles using on-airport roadways and associated areas.

Scope 2 - Indirect GHG emissions are associated with the generation of electricity consumed by the reporting entity (MNAA) and its tenants.

Scope 3 - Indirect & Optional GHG emissions are attributed to activities at MNAA, but are associated with sources that are neither owned nor controlled by MNAA. These include aircraft-related emissions and emissions from other airport tenant activities.

2011 GHG Emissions by Owner

Source: KB Environmental Sciences, 2011.



Scope 1: Airport
- Airport-owned motor vehicles/equipment
- Passenger, taxi, bus/shuttle service motor vehicles
- Boilers and water heaters
- Emergency generators
- Natural gas usage

Scope 2: Airport/Tenant
- Electrical usage

Scope 3: Tenant
- Aircraft
- Airline-owned motor vehicles/equipment
- Ground service equipment

10 **http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf**

Pre-conditioned air and 400 Hz power are provided to aircraft parked at two BNA gates, which reduces the use of auxiliary power units and their associated air pollutant emissions.

Current Air Quality Improvement Activities

Many energy saving and emissions reducing initiatives are in place at BNA and demonstrate MNAA's continued commitment to reduce its pollutant emissions and "carbon footprint" wherever possible. The following table lists examples of existing air quality and GHG-related sustainability initiatives at BNA.

Air Quality and GHG Reduction Initiatives	Sustainability Benefits
Installation of Baggage Conveyor System MNAA has recently installed a baggage conveyor system to help transfer collected baggage between the gate areas and the terminal area for processing. The baggage conveyor system helps reduce overall usage of baggage tractors by offering consolidated drop-off point(s) for use when transferring baggage to/from individual gates.	Reduced use of tractors reduces the amount of air quality pollutant emissions, and reduces injuries such as repetitive strain and backstrain.
Installation of Fixed Gate Power and Pre-conditioned Air Infrastructure at Terminal Gates MNAA has reduced the use of aircraft auxiliary power units (APU) and portable air conditioners, which provide power and comfort air to gated aircraft, by building these amenities directly into the gate infrastructure. According to an infrastructure assessment conducted in support of this study, 63% of the active gates at BNA currently are equipped with pre-conditioned air (PCA), and 76% are equipped with 400 Hz gate power.	When fossil-fueled devices are not running, air pollutant emissions in the gate area are greatly reduced, improving air quality for ground service personnel, passengers, and employees near the airfield. Further, MNAA's tenants are able to save jet fuel by avoiding APU usage, which translates into a GHG benefit.
Utilization of Electric-powered Ground Support Equipment (GSE) Some of MNAA's major tenants use electric-powered GSE (such as baggage tractors, belt loaders, and aircraft tractors). Because these types of equipment are in frequent use on the airfield, using electric power reduces emissions of air pollutants and GHGs compared with gasoline-powered GSE.	Because electric-powered GSE consume no fossil fuel and emit no combustion exhaust, significant air quality and GHG emissions savings are achieved.
Utilization of a Fuel Hydrant System MNAA's commercial service gates are equipped with an underground fuel hydrant system that connects stored fuel supplies to fixed dispensing points at each gate. Fixed gate equipment such as hydrant carts are available at most gates to dispense the fuel directly from the hydrant outlets to gated aircraft.	This system saves vehicle fuel, and reduces air pollutants and GHG emissions because it avoids the need for fuel tanker trucks to travel back and forth between the airfield and fuel storage areas to refuel aircraft.

Surface Transportation

Although airports are typically associated only with air transportation, they also function as surface transportation nodes. The combination of personal vehicles, taxis, and public transportation, such as buses, requires efficient surface transportation circulation and parking infrastructure to accommodate the different needs of all vehicles. Airports must balance the environmental effects of motor vehicle traffic accessing its facilities (mainly air pollutant emissions) and the generation of parking revenue.

Currently, the airport provides approximately 12,811 public parking spaces in six public parking facilities. For visitors to the Nashville area arriving via BNA who are not renting cars or for local residents who are not parking or getting dropped off at the airport, there are taxis and limousines available, as well as 14 bus or van shuttle service providers, including the public Metropolitan Transit Authority.

Public parking facilities at airports are important to their economic vitality because:

- Parking revenues provide cash flow to support other airport functions that generate no income or require subsidies (e.g., general aviation or passenger terminal public areas);
- Parking revenues represent the single largest source of debt-free cash flow to fund airport capital improvements; and,
- Parking revenue can assist in keeping overall operations economical, which is attractive to stakeholders.

Source: Transportation Research Board, Airport Cooperative Research Program (ACRP) Report 24: Guidebook for Evaluating Airport Parking Strategies and Supporting Technologies, 2009.

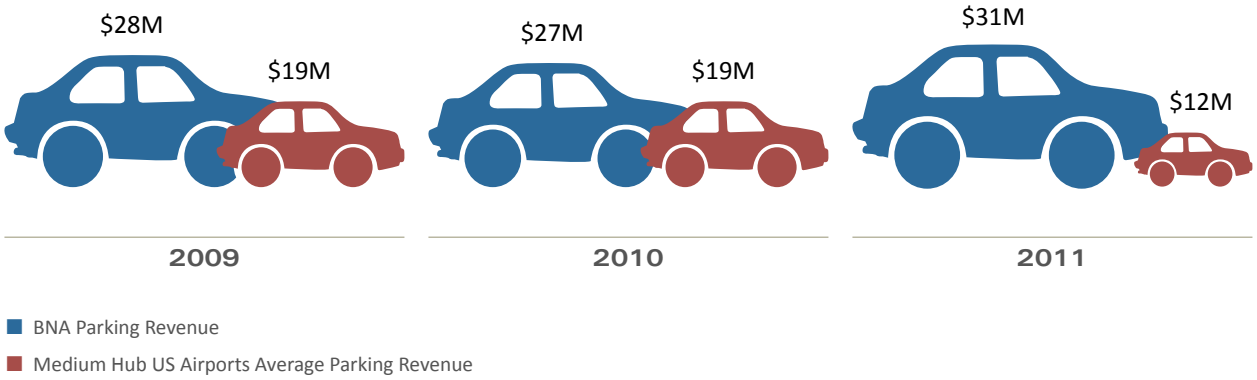
Current Surface Transportation Performance

Because on-airport parking fees are such an important revenue source for the airport (more than 34% of total airport revenue), the baseline surface transportation performance metrics focus on the revenue generated by parking operations. The amount of revenue generated by parking at BNA far exceeds the industry average for medium hub airports, as shown in the following chart.

BNA Parking Revenue Compared to Medium Hub U.S. Airports (2009-2011)

Source: Federal Aviation Administration, AAS-400, CATS, Report Form 5100-127.

Note: Data are not provided for these metrics prior to 2009 because of changes in accounting methods.



Current Surface Transportation Improvement Activities

The following sustainability activities related to surface transportation have been implemented by MNAA and have had positive economic and environmental benefits.

Surface Transportation Initiatives	Sustainability Benefits
BNA Frequent Parker Program The Frequent Parker Program aims to build loyalty to on-Airport parking at BNA with the following benefits to the traveling public: • Reserved section of spaces in Long Term A parking lot that are closest to the terminal which facilitates passengers walking to terminal, if desired. • Fast access in and out of all parking lots (excluding the valet lot), which reduces air emissions associated with vehicle idling to pay. • Free parking with earned points, excluding valet lot. • Convenient automated credit card payment.	Retains parking customers and reduces air emissions associated with vehicle idling at pay booths.
Online BNA Parking Survey MNAA provides an opportunity for the traveling public to provide information regarding use, value and issues with BNA public parking facilities.	Improves service and retains parking customers.
Installation of Curbside Waiting Areas Ten-minute parking spaces are provided at the terminal area curbside, where vehicle engines can be turned off as meeters/greeters wait for their passengers. These spaces are designed such that drivers pull-through from the entry lane to the exit lane, eliminating reversing into traffic, expediting exit and increasing passenger safety.	Curbside waiting areas reduce roadway congestion and enhance safety. Additionally, idling emissions from these vehicles are averted as a result, improving the air quality outside of the terminal area.
Installation of Occupancy Signage on Roadways and Parking Areas MNAA roadways and parking areas include electronic signage that informs drivers of the current estimated occupancy of parking areas (e.g., 26 spaces currently available in the Economy lot). The intent of this measure is to help drivers reduce the time spent searching for available spaces queuing in parking areas that are close to capacity.	Reduces excess driving time reduces roadway congestion, fuel consumption, and air pollutant/GHG emissions while enhancing safety.
Utilization of Cell Phone Waiting Area MNAA offers a free parking area with easy access to the airport roadway. Individuals in private passenger vehicles can park while waiting for arriving passengers to finish deplaning and collecting their baggage. This waiting area has a flight information display to provide arrival information, and it does not have the 10-minute time constraint of the curbside waiting area.	This measure reduces roadway congestion, air pollutants/GHG emissions by reducing the level of passenger pickup circulation and time spent idling by vehicles operating on the near-terminal roadways.

Surface Transportation Initiatives

Construction of a Consolidated Rental Car (CONRAC) Facility

The new CONRAC facility at BNA was opened in November 2011 and includes 2,400 ready/return parking stalls with space for 10 rental car companies just a short walk from the passenger terminal. At 1.2 million square feet, the facility is one of the largest projects in BNA history.

Features of the CONRAC Facility have various sustainability-related benefits, including:

- Use of reclaimed water for rental car washing;
- Screen vegetation wall to absorb and filter stormwater, reduce pollution and sequester GHGs; and,
- Public art display to enhance aesthetics of facility.

Sustainability Benefits

Consolidating rental car activities into one facility within walking distance of the terminal reduces air pollutant/GHG emissions by eliminating the need for shuttle trips between the terminal and the rental car facility. Emissions are also reduced by reducing vehicle miles of travel from rental car company personnel moving cars to and from remote turnaround facilities on airport property for service, cleaning and maintenance.

Aerial View of BNA's New CONRAC Facility

Aircraft Noise

Aircraft noise is typically the greatest concern residents have regarding a nearby airport. Inadequately addressing noise concerns of residents can adversely affect local support for an airport and delay or prevent future airport development. MNAA has proactively mitigated aircraft noise on surrounding land uses by participating in FAA's Part 150[11] noise compatibility program and offers neighbors methods to communicate aircraft noise concerns with the airport. Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP) were developed for BNA in 1989. The latest revision to BNA's Part 150 Program was the NEM Update completed in 2004 to determine the existing (2004) and future (2009) noise exposure with implemented noise compatibility measures and updated aircraft fleet mix and activity levels. MNAA is currently in the process of updating its NEM.

Current Noise Performance

Although there are currently no incompatible land uses surrounding BNA based on FAA standards,[12] local residents can still be affected by aircraft noise and feel the need to communicate their concerns with airport representatives. Residents can lodge noise complaints online at the *airport's website*[13] or by calling the aviation noise number (615-275-1643) provided on the airport's *Aviation Noise Information page*.[14] The number of complaints per thousand aircraft operations is shown in the adjacent chart.

Noise Complaints per 10,000 Aircraft Operations at BNA

Source: MNAA, 2012.

It is important to note that the higher number complaints in 2009 were due to the increased use of Runway 31 for departures while Runway 2L/20R was being reconstructed.

MNAA has implemented operational strategies to reduce day and night time noise disruptions to the neighboring community.

11 Title 14 Code of Federal Regulations (CFR) Part 150, Airport Noise Compatibility Planning. **http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=191c482131dea9029568bc15e180bfb8&rgn=div5&view=text&node=14:3.0.1.3.21&idno=14** Retrieved August 2012.

12 Residential land uses within the DNL 65 dB noise contour are considered incompatible, unless they were mitigated through a Part 150 Study. Day-night average sound level (DNL) is the 24-hour average sound level, in decibels, with an addition of ten decibels to aircraft sound levels during the periods between 10 p.m. and 7 a.m., when people are generally more sensitive to noise.

13 **http://www.nashintl.com/comments/**

14 **http://www.nashintl.com/about/noise.aspx**

Current Noise Reduction Activities

BNA utilizes multiple operational strategies to reduce aircraft noise exposure on noise-sensitive land uses, shown below.

Noise Reduction Initiatives	Sustainability Benefits
Modification of daytime runway use Runway utilization at BNA is a balanced north/south split.	Reduces noise impacts to residential populations near the airport.
Use of Runway 13/31 for nighttime operations Over 96% of nighttime operations depart/arrive to/from the east or southeast. Runway 13/31 is utilized for nighttime operations.	Avoids residential land uses during the nighttime period (10 p.m. to 7 a.m.).
Nighttime flight corridor use Use of nighttime flight corridors consist of the following headings: • Runway 13 departures turn to a heading of 090 degrees until reaching 3,600 feet mean sea level (MSL). • Runway 31 departures turn to a heading of 280 degrees until reaching 3,600 feet MSL, with turn to be initiated at 2 distance measuring equipment (DME). • Runway 20R departures turn to a heading of 180 degrees until reaching an altitude of 3,600 feet MSL. • Runway 20L departures turn to a heading of 180 degrees until reaching an altitude of 3,600 feet MSL.	Avoids residential land uses during the nighttime period.
Daytime flight corridor use Use of daytime flight corridors consist of the following headings: • Runway 31 departures follow runway heading then turn to 50 degrees or 280 degrees at 2 DME. • Runway 20R eastbound departures turn to the southeast (140 or 180 degrees). • Runway 20L westbound departures turn to the southwest (220 degrees).	Avoids residential land uses during the daytime period.

Additional Sustainability Initiatives Identified at BNA

During the course of this study, the Project Team identified other actions that MNAA is taking to enhance the economic, operational, natural and social environment in and around BNA. While many of these initiatives are not immediately considered sustainability strategies, they are in fact very important contributors to the long-term success of the Airport and the metropolitan Nashville region.

The BNA Master Plan Update 2012 is a major planning effort by MNAA to identify future facility needs and a development plan for the Airport over the next 20 years. In addition to occurring concurrently with the Sustainability Study and considering sustainability in its development plan alternatives evaluation, the Master Plan Update includes the following items that will aid in MNAA's sustainability efforts:

- Environmental overview of preferred development plan
- Identification of commercial development opportunities (to enhance revenue generating opportunities)
- Identification of sustainable passenger terminal design options
- Airport landside development plan to:
  - Understand how to best utilize available on-airport land, and
  - Attract tenants to establish operations at the airport.

Tenant Sustainability Activities

Like most major airports in the U.S., MNAA's tenants at BNA include airlines (passenger and cargo), airline service providers (food/fueling), in-terminal concessionaires, fixed-base operators (FBOs), ground service providers, on-demand/charter air service providers and the military. Many of the tenants at BNA have their sustainability programs implemented on a corporate level and/or implement sustainability into their operations at the Airport.

MNAA's management of tenant activities is conducted through individual lease agreements by incorporating minimum performance standards and practices. The lease agreements can include minimum requirements for sustainable activities like waste management and recycling. Aside from specific language in lease agreements, MNAA's influence over tenants' sustainability-related activities is currently limited – except where tenants' goals align with the Airport's and mutual assistance can be provided.

To understand the BNA tenants' sustainability-related activities, policies, and recommendations, a survey was developed and distributed to approximately 50 airport tenants. The purpose of the survey was to:

- Collect information on sustainability activities that tenants have planned or initiated;
- Provide a better understanding of potential opportunities for MNAA sustainability initiatives to support tenants' efforts; and,
- Assist in identification of potential sustainability strategies for MNAA.

The results of the survey indicated the following:

- More than half of the respondents have a formalized sustainability program, with highlights including:
  - ISO-registered GreenPath program[15]
  - Recycling programs (paper, metals, ink cartridges, coffee grounds, cooking oil, clothes hangers, fluorescent bulbs, water)
  - Sustainable store design and construction standards
  - Installation of energy-efficient lighting
  - Use of non-toxic paints and adhesives
  - Hazardous waste reduction program
- Single-engine aircraft taxiing is used when feasible to reduce fuel use and emissions

15 www.delawarenorth.com/Greenpath.aspx

- Future initiatives in development or under consideration include:
  - Use of fish that are not on the "avoid" list of the Monterey Bay Seafood Watch list
  - Installation of occupancy sensors to turn off lights when nobody is present
  - Alternative aircraft fuel research program
  - Additional recycling of materials included in aircraft maintenance and office activities
  - Paperless transactions and recordkeeping
- Desired assistance from MNAA to support tenant sustainability activities include:
  - Recycling infrastructure on the ramp close to aircraft catering and cleaning activities (each gate)
  - Charging stations for electric ground support equipment (GSE)
  - Glass recycling
  - Additional recycling receptacles
  - Disseminate sustainability best practices from other companies implementing sustainability initiatives

What are MNAA's Sustainability Goals and Objectives?

Based on the existing conditions and sustainability performance at BNA, MNAA developed high-level goals to strive for and various objectives to meet each goal. The goals revolve around the four components of the industry-accepted "EONS" definition of sustainability – Economic, Operational, Natural resources, and Social. To develop the goals and objectives, the Project Team looked to MNAA's existing management plans, systems, and processes, including:

MNAA Core Values[16] (E^3I) – These guiding principles were referenced to ensure that each goal category reflected at least one of the Airport Authority's core values:

- **Entertaining:** "Our facilities should have a beat and rhythm and exemplify our passion for customer service while being a unique and vibrant place through which to travel."
- **Exercising:** "Our most important assets - our employees and facilities - should be kept in top shape. Our employees should have the skills to perform their duties flexibly to meet the highest professional and ethical standards. Our facilities should be optimally managed, made secure and maintained for their entire life cycle."
- **Enterprising:** "We should have an entrepreneurial mindset that emphasizes innovation and financial efficiency."
- **Intersecting:** "We should be the center of Middle Tennessee's ideas and activities, and support its communities."

MNAA Performance Excellence 2011 Nonprofit Tennessee Center for Performance Excellence (TNCPE)[17] Application – As part of a comprehensive report detailing its adherence to Baldrige Performance Excellence criteria, MNAA identified 13 operational and strategic sustainability factors that relate to the triple-bottom line (economic, environmental, social responsibility). These sustainability factors were grouped to begin the development of sustainability study goal categories that were relevant to MNAA.

MNAA Long-Term Strategic Business Plan (LTSBP)[18] – The LTSBP contains 23 strategic objectives that support the Airport Authority's Core Values. The LTSBP strategic objectives were listed and grouped with similar objectives and goal categories.

16 **http://flynashville.com/about/core_values.aspx**

17 The TNCPE is a non-profit economic development organization that provides in-depth, low-cost assessments of regional organizations using the *Criteria for Performance Excellence.* Through a methodology based on the Baldrige Performance Excellence Program, organizations receive detailed feedback that they use to improve their processes and results **(www.tncpe.org/index.php)**.

18 MNAA, Long-term Strategic Business Plan, July 2012. **http://flynashville.com/about/businessplan.aspx.**

Enterprise Risk Management (ERM) – MNAA's ERM was reviewed to identify the various objectives (risks or opportunities), implementation status, owner (responsible MNAA manager), and initiatives in place to satisfy each ERM objective.

MNAA's Sustainability Goals and Objectives

Goals	Objectives
1. Enhance the economic vitality of BNA	Develop and maintain robust air service offerings
	Strengthen ties to the Nashville market, customers, and contractors
	Optimize passenger terminal and landside assets to enhance revenue
	Maximize development opportunities of aeronautical and non-aeronautical lands
	Develop and implement financial flexibility through cost containment, access to capital, and contingency planning
2. Ensure proper investment in the safety, security, and development of the people working at and using BNA to enhance work/passenger/visitor experience	Maintain the highest level of safety and security for passengers, customers, contractors and employees
	Enhance the Nashville Airports Experience
	Develop the MNAA workforce by ensuring proper recruitment, training, retention, and diversity
3. Develop and maintain facilities and infrastructure at BNA to support long-term, efficient, flexible growth	Foster asset management, life-cycle approach in construction operations to provide secure, flexible, and convenient facilities and equipment
	Ensure safe and secure Information Technology and data systems
	Develop plan for dealing with natural disasters and catastrophic events
	Develop land effectively in and around BNA to enhance aeronautical and non-aeronautical uses
4. Enhance the Nashville community	Promote business diversity
	Strengthen relationships with community partners and entrepreneurs and improve communication
	Minimize incompatible land uses surrounding BNA
5. Protect the valuable natural resources in and around BNA	Minimize environmental release and water quality non-compliance occurrences
	Maximize water conservation and minimize water use
	Minimize solid waste and increase recycling
	Monitor BNA's contribution to the Metropolitan Nashville region's air quality environment
	Monitor greenhouse gas (GHG) emissions from MNAA-controlled activities
	Manage existing sensitive natural resources on airport property
6. Minimize use and reliance on traditional energy sources to promote cost savings and environmental stewardship	Manage energy use.
	Evaluate renewable energy options
7. Enhance surface transportation connectivity with the Airport service area	Enhance demand for on-airport parking
	Foster intermodal transportation options at BNA

What will MNAA do to Meet its Sustainability Goals and Objectives?

To meet each sustainability objective, and in turn meet the goals, MNAA has considered a number of new initiatives (in addition to the continuation, or enhancement, of existing actions identified in this report). The following table provides a summary of initiatives MNAA is considering for short-term (0-3 years) implementation at BNA. The table shows what sustainability goals each strategy contributes to meeting and groups these strategies by **people, business/finance,** and **environment** to reflect the holistic nature of sustainability. This Sustainability Study has also identified mid- to long-term initiatives for MNAA consideration and further evaluation.

The Sustainability Study also identified potential funding sources that could be available for implementing various sustainability initiatives. Federal, state and local funding sources will be pursued for initiatives where appropriate, including:

- FAA Airport Improvement Program (AIP)
- FAA Passenger Facility Charge (PFC) Program
- FAA Voluntary Airport Low Emissions (VALE) Program
- Environmental Protection Agency (EPA) Clean Diesel Campaign
- EPA Community Action for Renewed Environment (CARE)
- Tennessee Department of Transportation (TDOT) Transportation Equity Fund
- TDOT Congestion Mitigation and Air Quality Improvement (CMAQ) Program
- Tennessee Department of Environment and Conservation (TDEC) Recycling Equipment Program
- Tennessee Agricultural Enhancement Program (TAEP) Community Tree Planting Projects
- Pathway Lending Energy Efficient Loan Program

People

Business/Finance

Environment

Potential Short-term Sustainability Strategies to meet BNA's Sustainability Goals and Objectives

Business/Finance

	ECONOMIC VITALITY	WORK/PASSENGER/VISITOR EXPERIENCE	FACILITIES AND INFRASTRUCTURE	NASHVILLE COMMUNITY	NATURAL RESOURCES	ENVIRONMENTAL STEWARDSHIP	TRANSPORTATION CONNECTIVITY
› Incorporate sustainability initiatives into BNA's marketing approach	●	○	○	○	○	○	○
› Through procurement processes, communicate sustainability goals and require documented sustainability experience from contractors/sub-contractors	○	●	●	●	●	●	○
› Consider alternative sources of financing for sustainability and other projects	●	○	●	○	○	○	○
› Evaluate tenant concessionaire contracts to determine the feasibility of incorporating sustainable practices	○	●	●	○	○	○	○
› Incorporate sustainability considerations into Airport/Tenant Improvement Manual (AIM)	●	●	●	○	○	○	○
› Include sustainability considerations in asset management program	●	○	●	○	○	○	○
› Plan and design facilities for the potential of adaptive re-use	●	○	●	○	●	●	○
› Track weather-related disruptions to the airport, including: hours of airfield closures, costs of infrastructure damage, lost operational revenue	○	●	●	●	○	○	○

People

› Create an area dedicated to exercise/yoga	○	●	○	○	○	○	○
› Improve public display of wellness/walking path in terminal complex	○	●	○	○	○	○	○
› Provide sustainability awareness training for employees, consultants and contractors	○	●	●	○	○	○	○
› Develop an Irregular Operations (IROPS) Contingency Plan to align with response efforts of the FAA, TSA, and Customs and Border Patrol (CBP) and mitigate hardships on airline passengers	○	●	○	○	○	○	○
› Implement strategy to find commercial use for the water in the on-airport quarry site (advancement of current feasibility report)	●	○	●	○	●	●	○
› Expand business diversity development programs at BNA	○	●	○	●	○	○	○
› Arrange for space in public areas for MNAA sustainability displays, awareness, and communication	○	●	○	●	○	○	○
› Develop process to gather airport sustainability data to promote to the public (Sustainability Plan reporting process – Report Card)	●	○	●	○	●	●	○
› Expand passenger engagement program for sustainability-related topics	○	●	○	○	○	○	○

Environment

› Upgrade stormwater collection and treatment facility	●	○	●	○	●	●	○
› Develop and implement an Environmental Management System (EMS)	●	○	●	○	●	●	○
› Install computer-controlled, "smart" irrigation systems	●	○	●	○	●	●	○
› Conduct a comprehensive audit and assessment of BNA's municipal solid waste stream	●	○	●	○	●	●	○
› Increase number of recycling bins in terminal/public spaces as well as in office spaces to collect recyclable municipal solid waste	●	●	●	○	●	○	○
› Enhance monitoring of municipal solid waste disposal	●	○	●	○	●	○	○
› Expand municipal solid waste recycling program to include glass (pending results of waste audit)	●	○	●	○	●	○	○
› Install liquid drain stations at security	●	●	●	○	●	○	○
› Encourage tenants to set up recycling bins on the ramp to support recycling of waste generated during aircraft cleanup/ turnaround. Ensure tenant addition of bins would not require additional fees imposed on the airlines.	○	○	●	○	●	○	○

Environment (cont.)

	ECONOMIC VITALITY	WORK/PASSENGER/VISITOR EXPERIENCE	FACILITIES AND INFRASTRUCTURE	NASHVILLE COMMUNITY	NATURAL RESOURCES	ENVIRONMENTAL STEWARDSHIP	TRANSPORTATION CONNECTIVITY
› Communicate benefits and monetary incentives for recycling to tenants in informational email on recycling program	○	○	●	○	●	○	○
› Encourage use of reusable totes at concessions	○	●	○	○	●	●	○
› Develop a formal MNAA policy for managing C&D materials and waste	●	○	●	○	●	●	○
› Develop contractor guidelines, to be included in all construction RFPs, on how to manage C&D waste	●	○	●	○	●	●	○
› Reduce packaging materials in packages delivered to BNA	○	○	○	○	●	●	○
› Implement environmentally preferred purchasing program	○	○	○	○	●	●	○
› Plan for fixed gate power and pre-conditioned air infrastructure at terminal gates	○	○	●	○	●	●	○
› Plan for surface transportation idling restrictions	○	●	○	●	●	○	○
› Update comprehensive air quality and GHG emissions inventory reports on regular basis	○	○	●	●	●	○	○
› Develop an alternative vehicle program for landside fleet and airside GSE and vehicles	○	●	●	●	●	●	○
› Provide alternative fuel infrastructure to the public, potentially including a CNG fueling station and electric vehicle charging stations	●	●	●	●	●	○	○
› Encourage Single-engine Taxiing	○	○	○	●	●	●	○
› Incentivize Use of Electric-powered Ground Service Equipment	○	○	●	●	●	●	○
› Incentivize Retrofit of Older Ground Service Equipment with Emissions Control Technology	○	○	●	●	●	●	○
› Provide Electric Charging Station Infrastructure for Electric Ground Service Equipment at Terminal Gates that don't currently have infrastructure in place	○	○	●	●	●	●	○
› Incentivize Ground Service Equipment Idling Reduction	○	○	○	●	●	●	○
› Encourage Employee Ridesharing, Carpooling and/or Telecommuting	○	●	○	○	●	●	●
› Investigate feasibility of implementing a Ground Transportation Management System	○	●	●	○	●	●	○
› Consider instituting AVI Permit Pricing Differential	○	○	○	●	●	●	○
› Develop Circulation Management Plan for On-Airport Traffic	○	●	○	●	●	●	○
› Implement use of recently developed eQuest model (developed by EnerNOC)	○	○	●	○	○	●	○
› Continue pursuing daylight controls	○	●	●	○	○	●	○
› Schedule International Arrival-Building (IAB) lights and air-handling units to turn off when IAB is unoccupied	○	○	●	○	○	●	○
› Convert single zone air-handling units in non-sterile areas to variable air volume using existing variable frequency drives	○	○	●	○	○	●	○
› Operate 24/7 air handling units at 50% speed between 9 p.m. and 6 a.m.	○	●	●	○	○	●	○
› Change zone temperature setpoints	○	●	●	○	○	●	○
› Retrocommission airport	○	○	●	○	○	●	○
› Relocate temperature sensors in Baggage Claim and Concourse C food court	○	○	●	○	○	●	○
› Install demand control ventilation for AHUs serving public spaces	○	●	●	○	○	●	○
› Replace remaining original chiller (CH-1)	○	○	●	○	○	●	○
› Coordinate with the Nashville MTA to enhance bus service to the airport	○	●	○	●	●	●	●

● Enhance the economic vitality of BNA by maximizing aeronautical and non-aeronautical revenue opportunities | ● Ensure proper investment in the safety, security, and development of people working at and using BNA to enhance work/passenger/visitor experience | ● Develop and maintain facilities and infrastructure at BNA to support long-term, efficient, flexible growth | ● Enhance the Nashville community | ● Protect the valuable natural resources in and around BNA | ● Minimize use and reliance on traditional sources to promote cost savings and environmental stewardship | ● Enhance surface transportation connectivity with the airport service area

How will MNAA Continually Improve its Sustainability Performance?

A key component to implementing sustainability at BNA is to track performance over time, report progress, and revise goals and objectives if necessary. This process is consistent with the Plan-Do-Check-Act (PDCA) model that MNAA implements through its Lean Six Sigma process.

Defining performance targets and tracking progress through the use of quantitative performance metrics will allow MNAA to understand what strategies may work and where further attention may be needed.

Initially, MNAA's performance targets will be "action-based," which means that performance will be based on successful implementation of recommended strategies. After a period of time during which MNAA tracks performance with quantitative data, performance targets will change to "results-based." Results-based targets will set quantitative goals in the different sustainability focus areas. Performance metrics have been identified by MNAA using existing organizational data sources, which will be used eventually to determine progress toward results-based targets.

Recent MNAA Milestones, Accomplishments and Awards

MNAA has completed many impressive accomplishments that have been recognized by the airport industry and local organizations. Recent accomplishments and awards include:

2010

BNA was recognized as the Airport with the **Best Overall Concessions Program** in the Medium Airport Division in the Airport Revenue News' 2010 Best Airport & Concessionaire Awards.

MNAA received the Certificate of **Achievement for Excellence in Financial Reporting** from the Government Finance Officers Association of the United States and Canada (GFOA) for the 2009 Comprehensive Annual Financial Report (CAFR).

2011

Winner of the **Richard A. Griesbach Award of Excellence** winner in the ACI-NA Airport Concessions Contest.

The **new Consolidated Rental Car Facility (CONRAC) facility** opened in November.

Representatives of eight Nashville-area small, minority- and woman-owned businesses graduated from **MNAA's Mentor/Protégé and Emerging Contractor class series.**

MNAA and **Arts at the Airport** installed and dedicated its largest permanent art piece, "Waveform: Pan American Blues," in Ticketing Lobby.

2012

In recognition of MNAA's efforts to promote wellness in the workplace, the American Heart Association awarded MNAA as **Gold Level Fit Friendly organization.**

Winner of the Achievement Award in the annual Excellence in Tennessee recognition program administered by the **Tennessee Center for Performance Excellence**.

Presentation of the 2011 Richard A. Griesbach Award of Excellence in Airport Concessions from Airports Council International-North America (ACI-NA) to MNAA. From left to right: Rebecca Ramsey (MNAA Properties), Greg Principato (ACI-NA), Robin Meade (CNN).

NASHVILLE INTERNATIONAL AIRPORT | Sustainability Study Highlights