

# Clean Fuel Project

# PHL

# PHILADELPHIA INTERNATIONAL AIRPORT



## A Strategic Plan for the Expansion of the Clean Fuel Vehicle Program at Philadelphia International Airport

Submitted to:  
National Renewable Energy Laboratory  
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February 2004

**CLEAN FUEL PROJECT PLAN:  
EXPANSION OF THE CLEAN FUEL VEHICLE PROGRAM AT  
PHILADELPHIA INTERNATIONAL AIRPORT**

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Submitted to:

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## GLOSSARY OF TERMS

**AFIG** – Alternative Fuels Incentive Grant, a program offered through the GPCCP and the DEP to provide funding assistance for the incremental purchase price of AFVs.

**Aftermarket** – Broad term that applies to any change after the original purchase, such as adding equipment. When applied to AFVs, it refers to conversion devices or kits for conventional fuel vehicles.

**Alternative Fuel** – Methanol, denatured ethanol, and other alcohols; mixtures containing 85% or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; non-alcohol fuels (such as biodiesel) derived from biological material; and electricity.

**Alternative Fuel Vehicle (AFV)** – As defined by the Energy Policy Act, any dedicated, flexible-fuel, or dual-fuel vehicle designed to operate on at least one alternative fuel.

**B20** – A blend of 20% biodiesel fuel with 80% petroleum-based diesel, by volume.

**Bi-Fuel Vehicle** – A vehicle with two separate fuel systems designed to run on either an alternative fuel, or gasoline or diesel, using only one fuel at a time.

**Clean Air Act (CAA)** – Signed into law in 1963, then amended in 1970, and again in 1990 (Clean Air Act Amendments of 1990). Includes emissions standard for mobile and stationary sources. Enforced by the U.S. Environmental Protection Agency.

**Compressed Natural Gas (CNG)** – Natural gas that has been compressed under high pressures, typically 3000 to 3600 psi, held in a container.

**Congestion Mitigation and Air Quality Improvement (CMAQ) Program** – A federal grant program established by ISTEA that allocates funds to states to help them simultaneously expand or initiate transportation services while improving air quality. CMAQ funds may be used to support alternative-fuel vehicle programs.

**Converted or Conversion Vehicle** – A vehicle originally designed to operate on gasoline or diesel that has been modified or altered to run on an alternative fuel.

**Dedicated Vehicle** – A vehicle that operates solely on one fuel. Generally, dedicated vehicles have superior emissions and performance results because their design has been optimized for operation on a single fuel.

**DEP** – The Pennsylvania Department of Environmental Protection

**Diesel Gallon Equivalent (dge)** – A unit for measuring alternative fuels so that they can be compared with diesel on an energy equivalent basis. This is required because the different fuels have different energy densities.

**Dual-Fuel Vehicle** - Vehicle designed to operate on a combination of an alternative fuel and a conventional fuel, typically as a mixture of gasoline or diesel and an alternative fuel in one fuel tank, commonly called flexible-fueled vehicles.

**DVRPC** – The Delaware Valley Regional Planning Commission

**E85** – A mixture containing 85% denatured ethanol and 15% gasoline, by volume.

**EV** - A vehicle powered by electricity, generally provided by batteries.

**Gasoline Gallon Equivalent (gge)** - A unit for measuring alternative fuels so that they can be compared with gasoline on an energy equivalent basis. This is required because the different fuels have different energy densities.

**GPCCP** – The Greater Philadelphia Clean Cities Program, established to promote and support the use of AFVs and supporting infrastructure in the Philadelphia region.

**GVWR** – Gross Vehicle Weight Rating

**Heavy-Duty Vehicle (HDV)** - Generally, a vehicle that has a GVWR of more than 26,000 lb. Definitions vary by organization.

**Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)** - An omnibus act that authorizes funds for highway construction, highway safety programs, and mass transit programs. ISTEA seeks a national intermodal surface transportation system that is economical, energy efficient, and environmentally sound. Section 1008 establishes the CMAQ Program, which can provide funds to support alternative-fuel and alternative-fuel vehicle programs.

**Light-Duty Vehicle (LDV)** – Passenger cars and trucks with a gross vehicle weight rating of 8,500 or less.

**Liquefied Natural Gas (LNG)** – Compressed natural gas that is cryogenically stored in its liquid state.

**Medium-Duty Vehicle (MDV)** – Typically, a vehicle with a GVWR of 8,500 to 14,000 lb.

**NGV** – A vehicle powered by natural gas.

**Non-Road Vehicle (off-road vehicle)** - A vehicle that does not travel streets, roads, or highways. Includes construction vehicles, locomotives, forklifts, tractors, golf carts, and so forth.

**OEM** – The original manufacturer of a vehicle or engine.

**Oxides of Nitrogen (NOx)** – Regulated air pollutants that are precursors to the formation of smog. They also contribute to the formation of acid rain.

**Particulate Matter (PM)** - A generic term for a broad class of chemically and physically diverse substances (pollutants) that exist as discrete particles over a wide range of sizes.

**PENNDOT** – The Pennsylvania Department of Transportation.

**PHL** – Philadelphia International Airport

**Propane (C<sub>3</sub>H<sub>8</sub>)** – A gas whose molecules are composed of three carbon and eight hydrogen atoms. Propane is the principal constituent in Liquefied Petroleum Gas (LPG).

**RFP** – Request for Proposal

**TPY** – Tons per year, a measurement of weight over time

**VMT** – Vehicle miles traveled.

## I. EXECUTIVE SUMMARY

The Philadelphia International Airport (PHL) is strengthening its environmental stewardship position by significantly expanding its current alternative fuel vehicle (AFV) program. The Airport's 2004 Clean Fuel Project as presented in this document provides detailed information about the planning process, planning team, supporting data and implementation schedule. The Airport's objectives in undertaking the Clean Fuel Project include expanding its Environmental Stewardship efforts, reducing exhaust emissions, increasing fuel diversity and security, reducing reliance on imported petroleum based fuels, and providing a clean fuel growth model for the region that supports advanced and clean technology/transportation and economic development opportunities.

The central elements in the Airport's 2004 Clean Fuel Project are the construction of a natural gas refueling station and a three-tiered approach to integrating natural gas vehicles (NGV) into PHL's bus fleet, airport support fleet and tenant fleets (see Section IV for detailed information on a fleet by fleet basis). By providing clean fuel access to Airport tenants and the general public, the Airport will establish itself as a regional hub for clean, non petroleum-based fuel infrastructure and future clean fuel expansion opportunities that may range from hybrid electric vehicles to fuel cell vehicles and from bio fuels to synthetic fuels.

The Project objectives and implementation schedule are the results of aggressive efforts by the Airport to develop a clean fuel strategy and secure and leverage available grant funds and other public monies that support advanced transportation technologies, petroleum fuel displacement and congestion mitigation projects. While there have been many contributors and stakeholders identified in support of this effort, special thanks and recognition are extended to the National Renewable Energy Laboratory, the Department of Energy's Clean Cities Program, airport tenants, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Transportation, Delaware Valley Regional Planning Commission, Natural Gas Vehicle Coalition, PECO, Philadelphia Gas Works, Greater Philadelphia Clean Cities Program, and Philadelphia's Municipal Energy Office. The National Renewable Energy Laboratory support included Tiger Team funding to secure the consulting services of Edwards and Kelcey, whose staff assumed the role as the prime architects of the planning process and implementation schedule.

The Clean Fuel Project will become a key element of the Airport's Master Plan environmental initiative. As part of the Master Plan, it will address three interconnected concepts extremely important to the Airport; *Maximizing Economic Advantages*, *Reducing Emissions* and *Enhancing Public Relations*. Specific strategies to be implemented to achieve these concepts at the Airport include:

- Convert the Airport's own fleet to alternative fuels (natural gas), where feasible, demonstrating its alternative fuel vehicle (AFV) leadership and commitment.
- Develop a new CNG station, with public access, to support AFV deployment at the Airport and for the region.

- Integrate pro-AFV policies into day-to-day operations and processes to support sustained AFV operations at PHL.
- Establish an agreement with the DEP to recognize offsets from the Airport's voluntary emission reduction efforts in relation to future Airport activities.
- Develop both an internal Airport stakeholder and a general public Outreach Plan to increase awareness and support for AFVs and for the Airport's AFV Plan.
- Update various budget and financial processes to include any necessary funding supplements or available cost sharing opportunities to support the AFV Program

## A. Action Items

The Clean Fuel Project will expand the current Airport AFV Program by achieving the following action items.

The goal is to expand the Airport's Environmental Stewardship activities, specifically through the expansion of its AFV Program. The primary strategies to fulfill this goal are:

### 1. Convert the Airport's own fleet to AFVs, where feasible, demonstrating AFV leadership and commitment.

The Airport has developed a phased approach to AFV deployment that initially focuses on PHL-owned/controlled fleets. This targeted approach will allow the Airport to focus on select fleets that can be more easily converted to AFV use, thus establishing a foundation for greater AFV deployment. Fleets were analyzed according to ownership and control, emission reduction potential, economic impacts, and fleet implementation complexity. This approach places Airport light-duty vehicles, sweepers and contracted parking shuttles in Tier 1 for immediate deployment efforts; Airport medium- and heavy-duty vehicles and rental car shuttles in Tier 2 for deployment in the next three to five years; and the remaining fleet targets in Tier 3, which will be considered long-term targets of opportunity. A brief overview of the characteristics and impacts of each of the tiers is provided below.

#### Fleet Target Emission Reduction and Cost Estimates

Target Fleet Element	Number Vehicles	Fleet Annual Mileage	Fleet Fuel Usage (gal)	Total NOx Source (tpy)	Total NOx Reduction (tpy)	Total Inc Costs †
TIER 1	149	2,291,400	474,900	61.28	34.71	\$1,780,000
TIER 2	113	1,522,800	379,600	109.84	86.80	\$2,760,000
TIER 3	150	7,400,000	670,000	44.25	26.06	\$1,300,000
<b>TOTAL ALL TIERS</b>	<b>412</b>	<b>11,214,200</b>	<b>1,525,500</b>	<b>215.37</b>	<b>147.57</b>	<b>\$5,840,000</b>

† Accounts for all incremental vehicle costs over the life of the Program

The Airport will begin Tier 1 fleet deployments by replacing existing vehicles with AFVs during regular replacement schedules, minimizing fleet disruption and cost impacts. Procurement processes shall be updated to include AFV vehicle options, and the Airport

will need to coordinate these efforts with City of Philadelphia agencies that play a notable role in Airport vehicle procurement. Other elements include operational considerations such as maintenance and training, as well as Airport staff education and benefit awareness programs for AFVs.

The primary fleet target in Tier 1 is the contracted parking shuttle operation. Conversion of these vehicles to CNG will have the greatest impact on the AFV Program due to their high fuel use. These shuttles will serve as the anchor fleet for the new CNG station and are well suited to optimize the environmental benefits of CNG use. A new bid for this service is to be released 2004 with the final contract and operations to begin in mid 2005. It is imperative that the Airport includes CNG use requirements in this new bid to maximize the potential of the AFV Program.

Tier 2 fleets will be pursued after Tier 1 fleets have been successfully established, however, some activities will need to commence now to facilitate their eventual deployment. Currently, rental car shuttles are the most abundant commercial fleet operating on the landside of the Airport. Like the contracted shuttle fleet, they are well matched to CNG use. Nationally many airports are consolidating these operations and moving them off-airport, reducing overall congestion, emissions and freeing up valuable Airport land space. If the Airport wishes to consolidate these operations in the future, as has been mentioned previously, they would ideally be switched to CNG at that time. To foster this eventual activity, the Airport must begin efforts towards a consolidated fleet plan now (or review/coordinate with similar Master Plan elements).

Tier 3 fleets will be reviewed after the Master Plan has been released and as Tier 1 and 2 fleets are established to determine any necessary developments or changes in priority.

### **Action Items for Fleet Deployment**

- Require AFV-use in next contracted parking shuttle procurement bid  
*Deliverable Date – Feb-Apr 2004 / Charge – Keith Brune, Operations Dept.*
- Update Airport and City procurement processes to require AFVs  
*Deliverable Date – Feb-Mar 2004 / Charge – PHL Maintenance Dept. and Office of Fleet Maintenance*
- Procure AFVs during all regular replacement of Tier 1 fleets  
*Deliverable Date – Mar 2004 / Charge – PHL Maintenance Dept.*
- Develop maintenance and training programs to support AFV fleet  
*Deliverable Date – Mar-May 2004 / Charge – Gerald Pawlowski, Maintenance*
- Investigate consolidation of rental car shuttle operations, in light of Master Planning process, and initiate activities that make this occur within next 3-5 years  
*Deliverable Date – May 2004 / Charge – AFV Champion Calvin Davenger*

## **2. Develop a new CNG station, with public access, to support vehicle deployment at the Airport**

Although the Airport has an operational CNG station, it will not sufficiently fuel all of the Tier 1 fleet vehicles, and cannot support both Tier 1 and Tier 2 fleets once they are

deployed. With the contracted CNG shuttle fleet to be deployed in mid 2005 the Airport must establish the new CNG station prior to this deployment date. These two events – the deployment of the contracted shuttle fleet and the opening of the new CNG station – will be the principal drivers of the AFV Program schedule. Another time related issue is the need for the Airport to submit this AFV Plan to PENNDOT promptly to regain the \$1.8 million in funding assistance that was recently withdrawn.

The Airport has chosen a site for the new CNG station, and concluded that it be treated like any other tenant land lease operation. The Airport will develop and release an RFP for a third-party to design, build and operate and maintain the CNG station. Unlike previous traditional engineering attempts for CNG station RFP efforts, this RFP will be a performance-based specification document. Performance-based RFPs differ in that they allow greater flexibility in third-party design and construction – so long as the resulting station meets the Airport's CNG fueling requirements. This approach will enable the Airport to receive the necessary fueling services at a lower cost, while simultaneously placing the responsibility of how the details of station design/development will be resolved on the bidders. The Airport will provide interested bidders with the details on fleet size, fueling needs, fueling times, and number of vehicles through the RFP process and using information contained within this Plan. This performance-based approach is the most common method used today for third-party CNG station development and several examples are available for review.

#### **Action Items for CNG Station Development**

- Submit the Airport's AFV Plan to PENNDOT to secure \$1.8M in grant funds.  
*Deliverable Date – Feb 2004 / Charge – AFV Champion Calvin Davenger*
- Review latest Master Plan initiatives with expected final CNG station location.  
*Deliverable Date – Feb 2004 / Charge – AFV Champion Calvin Davenger*
- Develop, release & select winning bidder for performance-based CNG station RFP.  
*Deliverable Date – Feb-Apr 2004 / Charge – AFV Champion Calvin Davenger*
- Update existing CNG station to accommodate any CNG vehicles deployed before the new CNG station is complete, and serve as secondary fueling thereafter.  
*Deliverable Date – May-Jul 2004 / Charge – AFV Champion Calvin Davenger*

### **3. Integrate pro-AFV policies into day-to-day operations and processes to support sustained AFV operations at PHL**

The foundation of any AFV Program is the set of policies put in place to support it over time. These policies, supported by top management champions and integrated into all aspects of an organization, provide the direction and guidance for a successful and sustainable AFV Program. The Airport will begin reviewing existing policies and developing and incorporating pro-AFV policies into all necessary elements of airport operations – from planning and purchasing to daily operations and equipment retirement.

By integrating comprehensive AFV policies into existing Airport policies and day-to-day operations, the Airport will reinforce its commitment to using AFVs while simultaneously making AFV-use seamless and attractive to Airport staff (and other potential users).

These policies will vary from mandated AFV requirements to encouragement of AFV users. The Airport will also investigate mechanisms to provide incentives for AFV use, or disincentives for non-AFV use, for Airport tenants and other fleets. Early efforts will focus on policies needed to support the Airport's own AFV fleets, with later concentration on tenants and the general public.

#### **Action Items for AFV Policy Development**

- Formally adopt and support the Clean Fuel Project, directing appropriate Airport staff to implement the action items contained within.  
*Deliverable Date – Feb 2004 / Charge – PHL Executive*
- Select an Airport AFV Champion to lead the CFP Plan effort.  
*Deliverable Date – Feb 2004 / Charge – PHL Executive*
- Establish an AFV Working Group, with outside partners, to provide additional technical support and to assist the Champion in implementing the CFP Plan.  
*Deliverable Date – Feb 2004 / Charge – AFV Champion Calvin Davenger*
- Establish AFV use requirements for targeted Airport Tier 2 and Tier 3 fleets.  
*Deliverable Date – May-Jul 2004 / Charge – Keith Brune, Operations*
- Select policies to incentivize & mandate AFV use in tenant and regional fleets.  
*Deliverable Date – May 2004 / Charge – AFV Champion Calvin Davenger*

#### **4. Establish an agreement with the DEP to recognize offsets from the Airport's voluntary emission reduction efforts in light of future activities.**

It is important that any voluntary emission reduction efforts undertaken now by the Airport not penalize the Airport in the future. To keep this from happening, the Airport has initiated discussions with the Pennsylvania Department of Environmental Protection (DEP) to ensure that any emission reductions are beneficial to the Airport and the DEP. The City's Air Management division should also be involved in these discussions.

Securing the emission reduction offsets at an airport while allowing the air regulatory agency to utilize the offsets for conformity purposes has been successfully negotiated at other airports and is a very important element of the FAA's current reauthorization efforts. In addition to providing funding assistance, the FAA has worked closely with the EPA to ensure that voluntary emission reductions through these AFV deployments is recognized by local air quality regulators – allowing both the airport and the air quality agencies to benefit from these voluntary emission reduction efforts.

#### **Action Items for Recognition of Voluntary Emission Reductions**

- Establish a schedule with the DEP for discussing emission reduction recognition and a timeframe for final agreement (mid 2005).  
*Deliverable Date – Mar 2004 / Charge – PHL Environmental Dept.*
- Follow FAA reauthorization bill for EPA/FAA emission reduction activities.  
*Deliverable Date – Mar 2004 / Charge – AFV Champion & Working Group*
- Coordinate AFV Program activities with ongoing Master Plan and EIS efforts.  
*Deliverable Date – Mar 2004 / Charge – AFV Champion Calvin Davenger*

- Review other airport emission reduction recognition strategies for applicability to the Airport's situation.

*Deliverable Date – Mar-May 2004 / Charge – AFV Champion & Working Group*

#### **5. Develop both an internal Airport and a general public Outreach Plan to increase awareness and support for AFVs and the Airport's AFV Program**

A key element of the AFV Program will be to communicate the existence, accomplishments and benefits of the Airport's AFV activities. Every effort will be made to publicize these activities internally, to airport tenants and passengers, and to the general public to promote greater Program involvement and demonstrate the Airport's concern for the community. AFV Program activities will be regularly promoted in the Environmental Stewardship publication, special AFV events, and the local media. Many of the Airports AFV Program partners have significant experience in promoting AFVs and will be vital to ensuring the successful promotion of this AFV Program. The Airport will continue to identify outreach and awareness mechanisms to enhance the acceptance and success of the AFV Program.

##### **Action Items for Development of AFV Outreach Programs**

- Investigate other airport and PR mechanisms to promote the AFV Program.  
*Deliverable Date – Feb-Apr 2004 / Charge – AFV Champion & Working Group*
- Develop an internal Airport AFV benefit education and awareness program.  
*Deliverable Date – Apr 2004 / Charge – PHL Marketing Dept.*
- Develop an AFV outreach (PR) program for tenants and the general public.  
*Deliverable Date – Apr 2004 / Charge – AFV Champion & Working Group*

#### **6. Update the budget and related financial processes to include any necessary funding supplements to support the AFV Program**

To support the long-term success of the AFV Program, budgetary processes must account for incremental vehicle and other associated costs. By anticipating and integrating these cost considerations into the annual budgeting and existing financial planning processes, the Airport can better prepare for successful AFV deployments.

Funding assistance should also be pursued to minimize any cost impacts of the AFV Program. The Airport, in cooperation with its AFV Program partners, will pursue funding assistance whenever possible to allow for greater cost effectiveness in deploying AFVs. This includes pursuit of assistance through the FAA's Vision 100 comprehensive 5-year reauthorization legislation, which will include funding assistance for AFVs at airports – the first time FAA reauthorization has included direct support for AFVs. By developing the AFV Program now, the Airport will be well positioned to pursue Vision 100 funding and will do so once the final document is released and made law.

The chart below highlights the anticipated number of new vehicles deployed and annual costs over the next decade.

Expected Annual Incremental Vehicle Costs and Fleet Deployment Numbers				
Year	Tier 1		Tiers 1 and 2	
	New CNG Vehicles Added	Annual Cost	New CNG Vehicles Added	Annual Cost
Current	10	-	10	-
2004	5	\$25,000	5	\$25,000
2005	30	\$1,025,000	30	\$1,025,000
2006	5	\$25,000	5	\$25,000
2007	5	\$25,000	5	\$25,000
2008	6	\$50,000	33	\$1,090,000
2009	5	\$25,000	7	\$65,000
2010	5	\$25,000	7	\$65,000
2011	6	\$50,000	8	\$90,000
2012	5	\$25,000	7	\$65,000
2013	5	\$25,000	7	\$65,000
<b>Totals</b>	<b>87</b>	<b>\$1,300,000</b>	<b>124</b>	<b>\$2,540,000</b>

### Action Items for Budgetary Considerations

- Update the budget to reflect anticipated incremental costs of new AFV purchases  
*Deliverable Date – Feb-Apr 2004 / Charge – PHL Executive*
- Develop funding requests/proposals for Vision-100 and other funding programs  
*Deliverable Date – Mar 2004 / Charge – AFV Champion & Working Group*

## B. KEY OUTCOMES AND IMPLEMENTATION TIMELINES

To leverage the current opportunities available to the Airport for expanding its AFV Program, several tasks must begin immediately. Only by undertaking these critical elements now will the Airport be able to develop an aggressive, successful AFV Program that will better position the Airport environmentally, economically, and in the public's perception. The most critical of these task elements are the **submission of this Plan to PENNDOT and the DVRPC to secure CNG station grant, inclusion of CNG requirement language in the contracted parking shuttle RFP and the development and release of an RFP for CNG station construction** within the first months of 2004. All other tasks will be coordinated to coincide with these elements. In order for all of this to occur, the Airport - especially the Executive Staff - must stand behind these activities and provide both support and momentum to ensure all Airport personnel work to achieve AFV Program success. The chart on the following page provides a summary of the proposed implementation timeline, key milestones and responsible Airport departments that will guide the Airport's AFV Program activities.

### Proposed 2004 Implementation Schedule for Key AFV Program Tasks

	Charge	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Convert Airport Fleets to AFVs</b>												
Update Airport procurement processes	<b>PR, OP, CH, WG</b>	[Bar from Feb to Mar]										
Begin normal AFV purchase schedule	<b>PR, OP</b>	[Bar from Apr to Dec]										
Secure AFV use in next shuttle contract		[Bar from Feb to Dec]										
Update RFP with AFV requirement	<b>OP, PR, CH, WG</b>	[Red bar from Feb to Mar]										
Release RFP & receive responses	<b>PR, OP, CH</b>	[Red bar with diamond from Mar to Apr]										
Negotiate final contract	<b>PR, EX, OP, CH</b>	[Bar from Apr to Jun]										
Begin deployment of CNG shuttle fleet	<b>OP, PR, CH</b>	[Bar from Jun to Dec]										
Pursue consolidated rental car shuttle operations	<b>CH, WG, OP, EX, LG</b>	[Bar from Apr to Dec]										
Develop maintenance and training programs	<b>OP, WG</b>	[Bar from Mar to Jun]										
<b>Develop a New CNG Station</b>												
Submit the AFV Plan to PENNDOT	<b>EX, CH</b>	[Red diamond in Feb]										
Review Master Plan initiatives with final CNG station location	<b>CH, EX, WG</b>	[Bar from Feb to Mar]										
Develop and release 3rd party performance RFP	<b>OP, EX, LG, CH, WG</b>	[Red bar from Feb to Apr]										
Bidder response to RFP	-	[Bar from Apr to May]										
Review RFP responses and select winner	<b>WG, EX, OP, FN, CH</b>	[Bar from May to Jun]										
Negotiate and sign final contract	<b>OP, EX, LG, CH, WG</b>	[Bar from Jun to Aug]										
Track third party station development	<b>CH, WG, EX, OP</b>	[Bar from Aug to Dec]										
Update existing CNG station	<b>CH, WG, OP</b>	[Bar from May to Dec]										
<b>Develop Pro-AFV Policies</b>												
Formally adopt Clean Fuel Plan	<b>EX</b>	[Red diamond in Feb]										
Select Airport AFV Champion	<b>EX</b>	[Black diamond in Feb]										
Establish AFV Working Group	<b>CH, EX, WG</b>	[Bar from Feb to Mar]										
Establish meeting schedule	<b>CH, WG</b>	[Bar from Mar to Apr]										
Establish Program & task priorities	<b>CH, EX, WG</b>	[Bar from Mar to Apr]										
Investigate other airport AFV outreach programs	<b>WG, CH, MK</b>	[Bar from Mar to Jun]										
Develop an internal AFV outreach program	<b>MK, WG, CH</b>	[Bar from Apr to Dec]										
Develop an external AFV outreach program	<b>WG, CH, MK</b>	[Bar from Apr to Dec]										
Establish pro-AFV policies for PHL fleets	<b>OP, WG, LG, EX</b>	[Bar from May to Dec]										
Investigate potential policies to encourage and promote AFV use in tenant & regional fleets	<b>WG, CH, MK, OP, EX</b>	[Bar from May to Dec]										
<b>Update Funding &amp; Budgetary Processes</b>												
Update budgets to reflect incremental costs	<b>FN, OP, CH</b>	[Bar from Feb to Mar]										
Develop proposals for Vision 100, SEP, and other opportunities	<b>WK, FN, OP, CH</b>	[Bar from Mar to Dec]										
<b>Establish Agreement with DEP for Securing Emission Reduction Recognition</b>												
Review other airport emission agreements	<b>CH, WG, EN</b>	[Bar from Feb to Mar]										
Coordinate with Master Plan and EIS activities	<b>CH, WG, OP, EN, EX</b>	[Bar from Feb to Dec]										
Work with DEP on emissions MOU schedule	<b>EN, EX, LG, CH, WG</b>	[Bar from Mar to Dec]										
Follow FAA reauthorization bill (EPA/FAA activities)	<b>WG, CH</b>	[Bar from Mar to Dec]										

Charge, with Key Responsibility in **BOLD**: EX = Executive Staff; OP = Operations; EN = Environmental; LG = Legal; PR = Procurement; FN = Finance/Budget; MK = Marketing; CH = Airport AFV Champion; WG = AFV Working Group  
 Critical (time sensitive) activities listed in **RED**

## II. BACKGROUND

Philadelphia International Airport serves over 24 million passengers annually and is the principal gateway for the fifth largest metropolitan population in the United States. The Airport is owned and operated by the City of Philadelphia's Division of Aviation (within the Department of Commerce), and serves Philadelphia, the surrounding Pennsylvania suburban and New Jersey suburban areas and the Wilmington, Delaware areas as well. Philadelphia International Airport is a major hub for US Airways and hosts over two dozen other passenger carriers and six all-cargo airlines.

The Airport is located approximately seven miles south of downtown Philadelphia and is easily accessible from Interstates 95, 76, and 476. In addition, rail and transit service to the airport is available, connecting the Airport with downtown Philadelphia and the metropolitan region. The Airport is in the center of the Mid Atlantic region of the East coast, which is classified as a severe *non-attainment area, for Ozone and NOx*, by the US Environmental Protection Agency.

Currently, a major Master Planning effort is underway, assessing the Airport's current capacity as well future development potential to the year 2020. Two alternative are being considered: a Parallel Runway Alternative that will extend the existing runways and construct a new 10,000 foot runway; and a Diagonal Runway Alternative that will result in four new runways being built (8,000 to 12,000 feet) that run diagonal to the existing runway layout. Both of these alternatives are being evaluated for their ability to reduce aircraft and passenger delays while measuring their impact on the environment.

Philadelphia Airport has significant experience in CNG vehicles, dating back to a fleet of CNG shuttles that were placed into operation in the mid 1990's. These shuttles were early conversions that were eventually removed from service due to fire issues. The fires were attributed to faulty conversion methods, not the CNG fuel itself. After the CNG shuttle fleet was retired the Airport continued to operate a small fleet of light-duty CNG vehicles, primarily vans and pickups. Some of these vehicles, and the CNG station built to support this fleet, are still in use today. Despite some setbacks with early CNG technologies, the Airport continues to support and demonstrate the ability of CNG to power fleets in airport operations.

### A. Clean Fuel Plan

The purpose of this Plan is to provide the framework for Philadelphia International Airport's expanded AFV Program. The Plan for AFV implementation addresses the fleets controlled by the Division of Aviation (DOA), defines how the implementation can be expanded to other fleets serving the Airport, and describes how the infrastructure to support these fleets should be established. The Plan also addresses policies that should be implemented to support AFV use, processes and steps for acquiring AFVs, suggested roles and responsibilities of key partners, a proposed project implementation schedule, and identification of potential future funding needs to sustain the project.

Though very important, this Clean Fuel Plan must be viewed as only a single, early step in an on-going and iterative process. The AFV Program must continually evolve in response to new information, new plans, new funding situations, and new opportunities

that arise over time. Paramount to this will be the development of the Airport Master Plan, which will impact how this program should be implemented. The Airport and its partners will be able to use this document as both a guide to establishing the AFV Program and a foundation for future AFV activity.

The creation of this Plan was based on an analytical and consensus-building process involving key departments at the Airport and its AFV Program partners, facilitated by Edwards and Kelcey. Initial efforts identified and characterized the various fleets on and around the Airport. Next, these fleets were analyzed to identify AFV opportunities and determine potential benefits. Strategies were then developed, with consideration to the Airport's objectives and the potential impact of each analyzed opportunity. Finally, fueling needs identified through target fleet analysis were compared to previous infrastructure designs to provide strategies for recommendations for the development of the natural gas fueling station at the Airport. In addition to elements such as fleet opportunities and infrastructure development, related issues including funding, potential partner roles and supporting policy development were reviewed. The result is a strategic plan that matches objectives with opportunities and identifies subsequent actions needed for implementation for each component of the Clean Fuel Plan.

## B. Goals and Objectives

One of the key outcomes of the AFV planning process was the establishment of Airport goals and objectives for development of the AFV Program. The primary goal is to develop the AFV Program into an integrated piece of the environmental picture and day-to-day operations at the Airport. This will be done by addressing three interconnected concepts at the Airport, including **Maximizing Economic Advantages**, **Reducing Emissions** and **Enhancing Public Relations**. Achieving all three goals will assist in better positioning the Airport through improved operations, added value, and for future growth. Another important factor will be securing official recognition with the Pennsylvania Department of Environmental Protection (DEP) for emission reduction activities gained through the AFV Program. Conversations with the DEP, outlined later in this document, will follow precedents set by other local and national initiatives, yet tailored to meet specific local needs. These actions will be developed to maximize achievement of all stakeholder goals and objectives

One of the first objectives of the Clean Fuel Plan will be the development of a new, larger CNG station at the Airport. This station will function as the anchor for the AFV Program, serving both the Airport fleets and airport tenants. It will also be publicly accessible by other AFV fleets in the region, assisting the establishment of regional infrastructure in the Philadelphia region. This CNG station must be developed quickly, as both the window on the available funding assistance and the inclusion of the Clean Fuel Plan into the Airport Master Planning process is rapidly closing. With the ability to leverage previous efforts in station design and placement, opening the CNG station by mid 2005 is an achievable goal.

Despite the current focus on natural gas vehicles, the Airport is open to any and all AFV technologies that can help it obtain the goals previously mentioned. It is only because of the constraints of the current funding opportunity (development of a natural gas

fueling station) that the plan has focused on natural gas and CNG. Because of this, the AFV Plan will continue to focus current efforts on natural gas activities, with occasional mention of other alternative fuels where necessary. As the Airport develops and expands its program, and other opportunities arise, other fuels and technologies will be considered and implemented where appropriate.

AFVs can help position the Airport for future adverse environmental impacts by achieving emission reductions, reducing economic impacts and providing a clear demonstration to the community of the Airport's commitment to the environment. The Airport recognizes that financial and practical constraints dictate that alternative fuels not be used immediately in all fleets and all vehicles. Rather, the introduction of AFVs is seen as an evolutionary, step-by-step process building over time to include as many fleets as possible, beginning with the fleets directly controlled by the Airport. This plan will proceed with those realities in mind and develop a targeted, phased program for AFV implementation at Philadelphia International Airport.

### **C. Regional Context**

Due to the Airport's central and accessible location – seven miles south of downtown Philadelphia and easily accessible from Interstates 95, 76, and 476 – any AFV Program developed at the Airport will serve as a showcase for the region. Any publicly accessible fueling established at the Airport will likewise become an anchor for AFV activity, providing fueling for the region and travelers along the Boston-DC I-95 corridor. For this reason the successful establishment of an AFV Program at the Airport and the establishment of supporting fueling infrastructure will reach far beyond the immediate airport surroundings.

The Airport will develop its AFV program to maximize the potential to assist the region's AFV efforts and the I-95 corridor whenever possible. Consideration will also include how the Airport's Program may facilitate similar activities in other regional fleets, such as SEPTA, the City of Philadelphia (e.g. the Water Department), or any other interested entities. The Airport hopes its efforts can assist the region by increasing awareness and opportunities through the development of its AFV Program as an anchor and showcase for the region.

### III. IDENTIFICATION OF STAKEHOLDERS

The Airport will provide the leadership and general direction for the Airport's AFV Program, including focusing initial efforts on converting its own fleet to alternative fuels. However, the Airport also realizes that a variety of partners will play critical roles in the success of this AFV Program. These partners will assist the development of the AFV Program through technical and commercial support, adding value that the Airport alone cannot provide. These partners will come from both on-airport operations and the surrounding community. All have common goals in seeing the development of an economically and environmentally beneficial AFV Program, the growth of the Airport in a sustainable manner, and community recognition for these AFV efforts. Listed below are the initially identified principal partners for the AFV Program and an overview of their anticipated primary roles in the Program. Over time, new partners are expected to join the AFV Program as it develops and expands. The following discussion expands on the roles of each group.

<b>Program Partner</b>	<b>Primary Role/Support</b>
Philadelphia International Airport	Fleet operator; Program leadership and direction
Greater Philadelphia Clean Cities Program (GPCCP)	AFV experience and contacts; assistance with project facilitation, public relations; pursuit of funding
City of Philadelphia	Fleet operator; coordination within larger City context
PECO Energy and Philadelphia Gas Works	Fleet operator; natural gas provider; AFV fueling experience and technical assistance
Delaware Valley Regional Planning Commission (DVRPC)	Metropolitan Regional Planning Office, CMAQ funds distributor
Pennsylvania Department of Environmental Protection (DEP)	State environmental regulator, conformity process
Airport Fleet Operators and Tenants (including Airlines/FBOs)	Fleet operators, fleet integration assistance; possible AFV experience at PHL and/or other locations
Pennsylvania Department of Transportation (PENNDOT)	Fleet operator, access to funding, air quality management

Each of these partners will play critical roles in the long-term successful development of the AFV Program. The Airport will be responsible for the most important of these roles – that of AFV Program direction and leadership. Every successful airport AFV program in the United States is built around the direction and commitment of an airport and its top officials. This dedication filters down to all levels of airport operations and becomes integrated into all airport activities. The Airport has demonstrated this commitment by initiating the current AFV planning process and designating an Airport AFV Champion. This Champion will be the lead for all AFV Program activities and primary contact for the Airport and Program partners.

Brief summaries of the partners and their potential areas of involvement are listed below along with contact information of those individuals and organizations that have already participated in the initial Program activities.

## **A. Key Stakeholders**

### **1. Greater Philadelphia Clean Cities Program**

The Greater Philadelphia Clean Cities Program (GPCCP) is a nonprofit organization dedicated to promoting the alternative fuels industry in the greater Philadelphia severe ozone non-attainment region. Its members work together to educate the public on alternative fuel technologies and applications, coordinate regional efforts to encourage alternative fuel use and develop the refueling infrastructure necessary to sustain the industry. As a fuel neutral organization dedicated to promoting alternative fuel vehicles in the region, GPCCP will be able to provide valuable information on the technologies, funding assistance, local AFV activities and related regulatory information. Their strong relationships with local and national alternative fuel organizations and businesses will provide a critical link between the Airport and the alternative fuel industry. The GPCCP will be solicited to help the Airport's AFV Program in the following activities:

- Play an active role in AFV Working Group
- Act as conduit for federal, regional and local AFV information and resources
- Provide DOE marketing and educational materials related to AFVs
- Assist in identifying and securing funding assistance
- Assist in securing AFV training classes
- Assist in public relations outreach and activities (Advancing the Choice)

### **2. City of Philadelphia**

The Airport, which is located in Philadelphia and Delaware Counties, is under the jurisdiction of the City of Philadelphia. To improve the AFV Program, and maximize potential benefits for the City, the Airport must develop its Clean Fuel Project in close cooperation with other City of Philadelphia agencies. Several affected agencies may need to be involved, or at the very least consulted, to maximize benefits to all parties. These include the Office of Fleet Management, who centrally support City departments and agencies by acquiring, assigning and maintaining City vehicles and equipment; the Municipal Energy Office, who are charged with improving energy efficiency and reducing costs in City-owned facilities; the Capital Program Office, who work with the Finance Department in financial oversight of the City's entire Capital Program; the Procurement Department who are the central purchasing and materials management agency for the City; and Air Management Services who are responsible for enforcement of the Air Management Code and regulations of the Air Pollution Control board. All of these City Agencies, and possibly several others, will likely be impacted by the Airport's AFV Program and should be involved when appropriate. The more participation by City Agencies other than the Airport, the more likely the Airport's Program and successes will be able to expand into other areas of the City's operations.

- Play an active role in the AFV Working Group

- Act as conduit for City of Philadelphia issues and related activities
- Coordinate City vehicle procurement policies and activities
- Coordinate AFV training and maintenance
- Coordinate public relations outreach and activities
- Coordinate activities with City's Air Quality Management Division
- Assist in identifying and securing funding assistance
- Publicize AFV Program success to other City fleets for greater AFV use

### **3. PECO Energy/Philadelphia Gas Works**

Two separate utilities provide gas service to the Airport: Philadelphia Gas Works (PGW) and PECO Energy. The majority of energy service is provided by PGW, the primary exception being the upper Northeast corner of the Airport. Both of these utilities have direct experience in the area of alternative fuel vehicles, specifically natural gas vehicles. Both utilities operate a number of CNG fueling stations (both public access and private) and have significant technical experience in CNG vehicles, stations and fueling issues.

Both PGW and PECO have expressed their interest in assisting the Airport develop a successful natural gas vehicle program. A successful AFV Program at the Airport would not only provide increased fuel throughput at the Airport (utility fuel sales), but would also provide an opportunity to leverage any success into other areas of Philadelphia. Both utilities will be able to provide technical assistance and support throughout the development and implementation of the AFV Program at the Airport. Potential partner activities include:

- Play active role in AFV Working Group
- Provide technical assistance in establishing infrastructure
- Assist Airport in assessing vehicle and station options
- Assist in CNG station RFP development and review
- Provide/help secure AFV and station training assistance
- Assist with AFV marketing and PR for AFV Program and activities
- Assist in identifying and securing funding
- Assist in marketing AFVs to regional fleets.

### **4. Delaware Valley Regional Planning Commission**

Established in 1965, the Delaware Valley Regional Planning Commission (DVRPC) provides comprehensive, coordinated planning for the orderly growth and development of the Philadelphia region (including nine counties in Pennsylvania and New Jersey). As an interstate, intercounty, and intercity agency, DVRPC advises on regional policy and capital funding issues concerning transportation, economic development, the environment, and land use.

The DVRPC will play an integral role in the AFV Program through its control of the CMAQ funds that will enable the Airport to establish a new CNG station. This station will be critical to the overall success of the AFV Program, at least as far as meeting expected fuel demand of early fleet targets. The Airport understands that these funds will only be available for a limited time, and will work closely with the DVRPC to use the funds effectively and immediately to construct the CNG station.

- Play active role in AFV Working Group
- Assist Airport in maximizing available grant funds for CNG station development
- Coordinate Airport AFV activities to maximize exposure
- Assist in marketing AFVs and Airport CNG station to regional fleets.

## **5. Pennsylvania Department of Environmental Protection**

The Pennsylvania Department of Environmental Protection (DEP) is the state agency largely responsible for administering Pennsylvania's environmental laws and regulations and its mission is to protect Pennsylvania's air, land and water from pollution. In addition, the DEP is committed to general environmental education and encouraging effective public involvement in setting environmental policy.

The Airport will work closely with the DEP on two fronts, to maximize the environmental benefits for the region and to use the AFV Program as a mechanism to increase environmental awareness and action in the region. In order to maximize potential emission benefits, the Airport will work with the DEP on developing a plan that establishes an emissions baseline and maintain this baseline through AFV introduction. There will also be opportunities for cooperation in promoting the AFV Program's successes and increasing education and awareness for AFVs and their benefits.

- Play active role in AFV Working Group
- Work with Airport to maximize emission reduction potential
- Work with Airport to secure emission reduction offsets
- Assist in identification of other potential emission reduction measures
- Assist in identifying and securing funding

## **6. Airport Fleet Operators (Landside and Airside)**

There are numerous fleet operators at the Airport, including fleets of parking shuttles, taxis, hotel shuttles, and airline and fixed-base operators (FBO). Many of these fleet operators will play important roles in the Airport's AFV Program. As vehicle owners and operators these tenants have opportunities to leverage the Airport's AFV successes and deploy their own AFV fleets. These fleet opportunities have proven successful at other airports, and can be equally successful at PHL. Some of these operations at other airports have resulted in not only significant emission reductions, but also cost reductions and efficiency improvements, not to mention positive PR advantages.

Some of these fleet operators are not targeted for early AFV adoption, but have great potential for future actions. However, before focus can turn to these fleets the Master Planning activities will need further development, as well as possible education of the potential benefits. The Airport will begin working with these fleet operators to discuss

the opportunities and identify targets and timelines for their inclusion into the AFV Program Plan.

- Play active role in AFV Working Group
- Assist Airport in identifying potential AFV fleet applications
- Coordinate national operator's AFV activities with Airport's AFV Program
- Cooperate with Airport on identifying and securing funding assistance

## **7. Pennsylvania Department of Transportation**

The Pennsylvania Department of Transportation (PENNDOT) owns and operates the nation's fifth largest state-owned highway system and administers one of the nation's largest grant programs for mass transit, rail freight and aviation. PENNDOT also processes 30 million driver and vehicle customer service transactions each year, and operates the 12 Pennsylvania Welcome Centers that greet over three million visitors annually.

The CMAQ funds that have been offered to the Airport to build the new CNG station are, in part, administered by PENNDOT, who have a vested interest in seeing the Airport develop a successful CNG station and AFV Program. The Airport will work closely with PENNDOT to satisfy any requirements of this funding and develop the best possible CNG station and AFV Program that can be duplicated and leveraged by others throughout the region.

- Play active role in AFV Working Group
- Assist Airport in maximizing available grant funds for CNG station development
- Assist Airport in identifying potential AFV fleet applications
- Coordinate AFV Program activities with other potential transportation activities in the region

## **8. Other Potential Partners and Stakeholders**

Additional partners and stakeholders are certain to become involved as the Program expands and develops. These new stakeholders will range from public to private entities and fleet operators to technical experts. Their involvement and participation will provide additional insight and experience for the Program and fleet deployments at PHL. These potential partners should be actively courted for Program involvement. The details of this involvement will vary according to stakeholder and situation, but each should be invited to participate in the AFV Working Group, as a minimum.

## **B. AFV Working Group**

In order to develop a stronger Program, the Airport will establish an AFV Working Group. This Working Group will be responsible for developing the Program in a manner that reflects the goals of the Airport and its partners. Initial goals and objectives have been established, as outlined previously, but new goals and objectives will arise in the future and as current activities are completed. The Airport, through the designated AFV

Champion, will lead this Working Group, which will meet on a regular basis to review Program goals, evaluate current activities, and initiate additional activities as necessary.

The Working Group will be comprised of the key Program partners; many already identified. These Working Group partners will be able to provide substantial assistance in the planning and development of the AFV Program and will be critical to the Program's success. Working Group responsibilities will include:

- Develop AFV Program initiatives and activities
- Ensure Working Group includes all relevant/necessary partners – solicit additional stakeholders as required
- Provide technology updates and implementation recommendations
- Coordinate efforts between Airport and other regional AFV activities
- Conduct periodic public outreach campaigns on AFV activities.
- Meet regularly to review and update AFV Program activities

The Airport's AFV Champion will establish a regular schedule for the AFV Working Group to meet. During the early stages of AFV Program development these meetings will likely be frequent, at least quarterly, to ensure the immediate objectives and activities of the AFV Program are met. After the AFV Program has been established and notable progress has been made, such as internal AFV-supporting policies have been adopted, these meetings may be able to be less frequent.

## Identified Stakeholder Contact List

### Philadelphia International Airport

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Gerard Pawlowski	Aviation Fleet Services Spvrs.	(215) 937-6784	<a href="mailto:Jerry.pawlowski@phl.org">Jerry.pawlowski@phl.org</a>
Mark Gale	Deputy Director of Aviation Operations and Facilities	(215) 937-6952	<a href="mailto:mark.gale@phl.org">mark.gale@phl.org</a>

### City of Philadelphia

Michelle Knapik	Philadelphia Energy Office	(215) 686-4472	<a href="mailto:Michelle.Knapik@phila.gov">Michelle.Knapik@phila.gov</a>
Morris Fine	Air Management Services	(215) 685-7585	<a href="mailto:morris.fine@phila.gov">morris.fine@phila.gov</a>

### Department of Energy / Philadelphia Clean Cities Coalition

Patricia Passarella	Regional Clean Cities Manager	(215) 656-6966	<a href="mailto:patricia.passarella@ee.doe.gov">patricia.passarella@ee.doe.gov</a>
Eric Cheung	Coordinator, Philadelphia Clean Cities,	(215) 567-4004	<a href="mailto:echeung@cleanair.org">echeung@cleanair.org</a>
Paul Miles	Chair, Philadelphia Clean Cities	(215) 841-4082	<a href="mailto:paulw.miles@exeloncorp.com">paulw.miles@exeloncorp.com</a>

### Philadelphia Gas Works

Scott Dever	Major Accounts Specialist	(215) 684-6557	<a href="mailto:Scott.Dever@pgworks.com">Scott.Dever@pgworks.com</a>
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### PECO Energy

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Paul Miles	Manager, Technical Services	(215) 841-4082	<a href="mailto:Paulw.miles@exeloncorp.com">Paulw.miles@exeloncorp.com</a>

### Delaware Valley Regional Planning Commission

Charles Dougherty	Assoc. Dir. Tran Planning Div	(215) 238-2863	<a href="mailto:cdougherty@dvrpc.org">cdougherty@dvrpc.org</a>
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### Pennsylvania Department of Transportation

Mike Baker	Air Quality	(717) 772-0796	
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### Department of Environmental Protection

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Chris Trostle	Mobile Source	(717) 787-9495	<a href="mailto:dtrostle@state.pa.us">dtrostle@state.pa.us</a>

### Edwards & Kelcey

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## IV. OVERVIEW OF FLEETS AND PHASING

### A. Fleet Assessment

After the initial AFV planning meeting and presentation, preliminary fleet targets were identified. These fleets were identified through Airport data and records, as well as new fleet surveys conducted at the Airport. Also, where survey data were not available, (e.g., the ground services equipment) accepted industry models and comparisons to fleets from other airports were used to develop estimates of fleet size. These individual fleets were evaluated from the standpoint of total fleet size, annual fuel consumption and annual mileage (or use hours) to determine justification for continued inclusion within the AFV Program. These initial fleets are presented in the following chart.

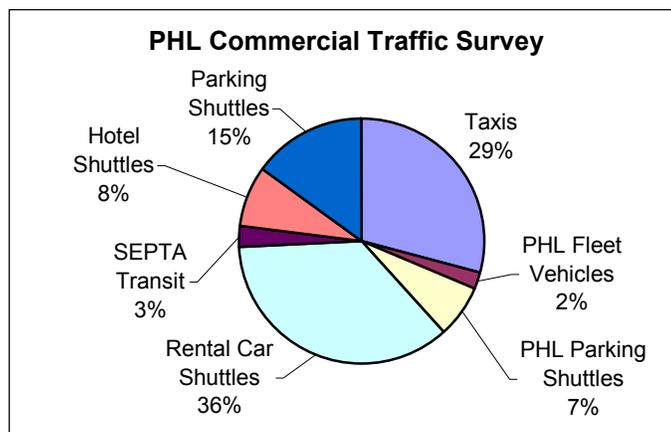
Initial AFV Fleet Targets				
Use Category	Fleet Type	Number of Vehicles	Estimated Annual Fleet Mileage (or Use Hours)	Estimated Annual Fleet Fuel Consumption (in gallons)
PHL	Light Duty Fleet	116	1,160,000	96,700
	Contracted Shuttles	25	1,125,000	375,000
	Medium/Heavy Duty and Offroad	88	272,800	54,600
	Sweepers	8	6,400	3,200
Ground Access Vehicles	Parking Shuttles	70	2,800,000	350,000
	Rental Car Shuttles	70	3,500,000	560,000
	Hotel Shuttles	40	1,600,000	120,000
	Taxis	40	3,000,000	200,000
Ground Service Equipment	Tugs, Belt Loaders, Pushbacks, & Lifts	355	(426,000)	213,000
	Air Start, GPU, Air Condition Units	73	(146,000)	73,000
	Fuel, Water, Lavatory & Service Trucks	204	(92,000)	23,000

*Landside fuel usage obtained by using reported VMT and mpg data and according to industry standards according to each fleet and fuel type*

*Airside GSE and truck fleet estimates obtained from EPA's EPA420-R-99-007 document and "Airport GSE Emissions and Cost-Effectiveness Analysis Tool"*

*Certain electric powered GSE, while not directly within the scope of this project, were reviewed due to the significant economic and environmental impact potential of these fleets. Many GSE are extremely well suited to operation by electric power, and can provide operators with positive return on investment and regional air quality regulators with significant reductions in emissions. Deployment of these electric GSE fleets requires sufficient electric power at terminals/gates and supporting electric charging equipment. Installation of this electrical equipment is considerably more cost effective when done in coordination with other terminal developments. With the current Master Planning efforts these fleets were presented as a reminder that their consideration in these early planning stages can provide exceptional long-term benefits to PHL and all stakeholders. These airside vehicles are briefly included in the remaining portions of the AFV Program Plan.*

Site surveys conducted in July at the Airport analyzed total commercial traffic accessing the terminals throughout the day. The following graph illustrates the landside commercial fleet mix accessing the Airport on a daily basis.



The landside fleets were further analyzed for overall program cost and emission reduction potential. Incremental alternative fuel vehicle costs were obtained from comparable OEM models, and total program costs per fleet were developed. Approximate averages were used when multiple AFV or engine options were available for a fleet target. These total fleet incremental costs assume 100% of the fleet is converted to CNG. These results are presented as relative comparisons for planning efforts, not definitive program costs. Estimated incremental costs for all fleet targets totals approximately \$5.8 million.

Relative emissions estimates and reductions were developed from collected fleet data and the EPA Mobile 6 model. Additional fleet and other data inputs will provide more refined emission estimates, necessary when discussing conformity emission credit potential, but the results do provide general emission estimates for comparison purposes. Estimated emission reduction potential for all fleet targets totals approximately 148 tons of NO<sub>x</sub> per year.

Once initial fleet emission reductions and cost estimates were obtained, the Airport prioritized the fleet targets for the AFV implementation plan. Factors considered in this process included emission reduction potential, estimated incremental costs, fleet ownership/control, and complexity of implementation. A three-tier plan was developed, where Tier 1 targets are to be immediately pursued, Tier 2 considered for short-term deployment of 3-5 years, and the remaining fleets to be targeted for long-term inclusion. Tier 1 fleets include the Airport's light-duty vehicle (LDV) and sweeper fleets, as well as the contracted parking shuttles; Tier 2 includes the Airport's medium- and heavy-duty vehicle fleets and the rental car shuttles (not individual rental cars); and the remaining fleets are delegated to Tier 3 future target status. The table on the following page illustrates the Tier breakdowns by fleet type, key operating characteristics, estimated emission reductions and cost estimates.

**FLEET TARGET EMISSION REDUCTION AND COST ESTIMATES – BY FLEET TARGET**

Element		Number Vehicles	Fleet Turnover* (years from inception)	Vehicle Annual Mileage	Fleet Annual Mileage	Fleet Fuel Usage (gal)	Total NOx Source (tpy)	Total NOx Reduction (tpy)	Unit Inc Cost	Total Inc Cost
Tier 1	Light Duty Fleet	116	5+	10,000	1,160,000	96,700	2.74	2.61	\$5,000	\$580,000
	Contracted Shuttles	25	2005	45,000	1,125,000	375,000	58.43	32.04	\$40,000	\$1,000,000
	Sweepers	8	6	800	6,400	3,200	0.11	0.06	\$25,000	\$200,000
	<b>TOTAL TIER 1</b>	<b>149</b>	<b>6 yrs</b>		<b>2,291,400</b>	<b>474,900</b>	<b>61.28</b>	<b>34.71</b>		<b>\$1,780,000</b>
Tier 2	Medium/Heavy Duty and Offroad	88	10	3,100	272,800	54,600	6.14	3.36	\$10,000 to \$40,000	\$1,760,000
	Rental Car Shuttles <sup>†</sup> (consolidated option)	25	~3	52,000	1,250,000	325,000	103.70	83.44	\$40,000	\$1,000,000
	Rental Car Shuttles <sup>‡</sup>	70	3-5	52,000	3,500,000	560,000	103.70	56.72	\$40,000	\$2,800,000
	<b>TOTAL TIER 2 (consolidated Option)</b>	<b>113</b>	<b>10 yrs</b>		<b>1,522,800</b>	<b>379,600</b>	<b>109.84</b>	<b>86.80</b>		<b>\$2,760,000</b>
Tier 3	Parking Shuttles	70	4	40,000	2,800,000	350,000	9.61	5.26	\$10,000	\$700,000
	Hotel Shuttles	40	4	40,000	1,600,000	120,000	28.89	15.80	\$10,000	\$400,000
	Taxis <sup>††</sup>	40	8	75,000	3,000,000	200,000	5.75	5.00	\$5,000	\$200,000
	<b>TOTAL TIER 3</b>	<b>150</b>	<b>8 yrs</b>		<b>7,400,000</b>	<b>670,000</b>	<b>44.25</b>	<b>26.06</b>		<b>\$1,300,000</b>
<b>TOTAL TIERS 1 and 2 (consolidated option)</b>		<b>262</b>	<b>10 yrs</b>		<b>3,814,200</b>	<b>855,500</b>	<b>171.12</b>	<b>121.51</b>		<b>\$4,540,000</b>
<b>TOTAL ALL TIERS (consolidated option)</b>		<b>412</b>	<b>20+ yrs</b>		<b>11,214,200</b>	<b>1,525,500</b>	<b>215.37</b>	<b>147.57</b>		<b>\$5,840,000</b>

\* Fleet turnover rates obtained from PHL data and tenant interviews and represent number of years vehicles are kept before replacement

† Consolidated option replacing ~70 individually operated Rental Car Shuttles with fleet of 25 CNG vehicles operated by one contractor

‡ If consolidation is not pursued, only considers replacement of 70 diesel with 70 CNG shuttles

†† Taxi emissions only considered within the immediate PHL vicinity, taxis are expected to generate significantly greater emissions overall

Emission estimates from EPA Mobil 6 using average five-year vehicle age and 20 mph speeds



## **B. Prioritization of Individual Fleet targets**

The fleet activities of the Airport's AFV implementation plan will initially focus on PHL owned/operated vehicles, primarily due to direct control of purchase and operation decisions. Experience at other airports has shown that this also provides a positive example of leadership and helps to build the critical mass necessary for program success. After there has been success in establishing these Tier 1 fleets (PHL light-duty, contracted shuttles, and sweepers), the Tier 2 fleets will be targeted for AFV integration. Tier 3 fleets will be tracked over time and targeted for CNG deployment as circumstances dictate. Detailed information on each target fleet is provided below.

Whenever possible, the Airport will purchase OEM products. When OEM products are not available, certified conversion kits will be secured. The Airport's light-duty SUV and medium- and heavy-duty fleets are examples of vehicles more likely to rely on conversion kits due to limited OEM availability. Use of OEM vehicles, and certified conversion kits, will result in better quality vehicle systems, reduced maintenance needs, and additional assurance that full emission reduction potential will be achieved.

Some fleet targets may not be able to achieve 100% CNG conversion and/or will take several years for full fleet integration. Although the Airport will make every attempt to convert all target fleets, product availability, special fleet use applications, and economic realities may keep some fleets from making a complete conversion to CNG.

### **1. First Tier Targets**

The Airport will begin targeting Tier 1 fleets for immediate conversion to CNG. Airport light-duty and sweeper fleets will begin replacing existing vehicles with CNG during regular replacement schedules. With light-duty vehicles replaced roughly every five years, approximately 23 LDVs are purchased annually. Financially the Airport may not be able to purchase this many AFVs each year, especially in the early years when AFVs have not yet been integrated into vehicle budget requests. This will have the effect of slowing early AFV purchases, extending total fleet conversion periods. However, as described later in this document, grants and other funding assistance will be pursued to offset these incremental costs and allow for faster conversion rates.

The Airport will begin targeting Tier 1 fleets for immediate conversion and begin purchasing AFVs in place of conventional vehicles during regular vehicle replacement schedules. This will be the favored replacement method for Tier 1 LDV and sweeper fleets. By integrating new AFVs into the fleet during scheduled vehicle replacement, the Airport will minimize cost impacts by spreading these purchases over a number of years. In some years the vehicle turnover of certain fleets may limit the ability to convert all new purchase needs to CNG due to cost impacts. This will have the effect of slowing AFV purchases, extending total fleet conversion periods. However, as described later in this document, grants and other funding assistance will be pursued to offset these incremental costs and allow for faster conversion rates. The negative impact of large vehicle purchases in a given year may be especially true in the early years, when the incremental costs of AFVs have not yet been integrated into future budget requests.

Other fleets, such as the contracted parking shuttle fleet and the consolidated rental car shuttle option, are operated through third-party contracts and can be converted to CNG “overnight”, by requiring the contractors to use AFVs. The existing parking shuttle contract is set to expire soon, with a new contract to be awarded in mid-2005. This places an aggressive, yet entirely feasible, timetable to include CNG requirements in this pending RFP and contract agreement. This will require considerable and immediate attention by the Airport to ensure that this fleet switches to CNG during the next contract period and will drive the timeline for the new CNG station to be completed at the same time.

### **PHL Light Duty Fleet**

<i>Fleet Size:</i>	116
<i>Owner/Operator:</i>	PHL
<i>Annual Miles:</i>	10,000 per vehicle; 1,160,000 total fleet
<i>Annual Fuel Use:</i>	830 gallons per vehicle; 96,700 gallons total fleet
<i>Current Fuel:</i>	Gasoline
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	2.61 tons/year
<i>Incremental Cost:</i>	\$5,000 per vehicle; \$580,000 fleet total
<i>Primary Funding:</i>	PHL
<i>Fueling:</i>	At existing CNG station, and new station when constructed
<i>Key Partners:</i>	GPCCP, PECO, PGW, OEMs
<i>Fleet Timeline:</i>	Five to ten years – during regular replacement schedule

The Airport operates 116 gasoline-powered light duty vehicles that are used to provide a variety of airport and operational support services. The majority of these are SUVs (60%), while the others are a mix of pickup trucks, vans and sedans. Individually the light duty fleet averages roughly 10,000 miles per year and 12 miles per gallon. The vehicles do not typically leave the airport property, and therefore, travel relatively few annual miles and consume similarly small amounts of fuel.

When the fleet has been fully converted to CNG operations NOx emissions will be reduced by approximately 2.61 tons/year. Even more important than the emission reduction potential of this fleet is the leadership example it sets for other airport and regional fleets. The high exposure of this fleet to other tenant fleets will illustrate the Airport’s commitment to the AFV Program.

Fleet conversion will occur during normal vehicle replacement schedules, which is approximately every five years. This simple replacement approach will minimize disruption of current purchasing and operation processes and results in approximately 23 new LDVs annually. However, cost constraints and other obstacles may extend this timeframe for fleet conversion, likewise reducing the number of AFVs effectively replaced each year. To minimize this financial impact, and the extended fleet conversion timeline, the Airport should promptly begin pursuit of funding assistance to reduce Program costs. Total incremental costs will be approximately \$580,000 for the entire fleet, which will be disbursed over the years. Due to the gradual integration schedule the fleet will be able to fuel successfully at the existing station until the new CNG facility is constructed. The fleet will then be able to use either facility for fueling.

Action Items for Light-Duty AFV Deployment			
Activity	Airport Responsibility & Partners		Timeframe
Confirm AFV availability	WG	GPCCP, OEMs	Feb 2004 <sup>†</sup>
Update procurement list with AFVs	PR, OP	City of Philadelphia – Fleet Management	Feb-Mar 2004 <sup>‡</sup>
Budget for incremental vehicle costs	FN, PR	City of Philadelphia – Fleet Management	Feb-Mar 2004 <sup>†</sup>
Develop AFV procurement specs (RFQ)	PR, WG	City of Philadelphia – Fleet Management	Mar-Apr 2004 <sup>‡</sup>
Release RFQ for vehicles & await response	PR, OP, WG	City of Philadelphia – Fleet Management	May 2004 <sup>‡</sup>
Review and select from RFQ responses	PR, OP	City of Philadelphia – Fleet Management	Jun 2004
Establish plan for maintenance and fueling	OP	City of Philadelphia – Fleet Management, PECO/PGW	Apr-Jun 2004
Pursue funding assistance	FN, OP, WG	GPCCP	Continuous
WG=AFV Working Group; PR=Procurement; OP=Operations; FN=Finance/Budget; EX=Executive <sup>†</sup> – Annually thereafter <sup>‡</sup> – As needed thereafter			

In order to begin immediate procurement of alternative fuels into the light duty fleet the Airport will begin adopting policies that reinforce integration efforts. This will include updating procurement lists to preference AFVs and ensuring vehicle procurement budgets account for any incremental costs. AFV procurement preference should direct AFV procurement as the normal process status quo, requiring written explanation of why any traditional fuel vehicle purchase should be granted an exception. Updating the Airport's procurement guidelines and documentation will incorporate AFV purchase processes and philosophies.

### **PHL Contracted Parking Shuttle Fleet**

<i>Fleet Size:</i>	25
<i>Owner/Operator:</i>	PHL owned, operated under third party contract
<i>Annual Miles:</i>	45,000 per vehicle; 1,125,000 total fleet
<i>Annual Fuel Use:</i>	15,000 gallons per vehicle; 375,000 gallons total fleet
<i>Current Fuel:</i>	Diesel
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	32.04 tons/year
<i>Incremental Cost:</i>	\$40,000 per vehicle; \$1,000,000 total fleet
<i>Primary Funding:</i>	PHL/Contractor
<i>Fueling:</i>	At new CNG station
<i>Key Partners:</i>	GPCCP, City of Philadelphia, contracted fleet operator
<i>Fleet Timeline:</i>	Two years – next contract agreement (mid 2005)

A diesel transit-style bus fleet operates in a constant loop approximately 20 hours/day, shuttling passengers and employees from the parking lots to the terminals. PHL contracts these buses through a third party operator who own/maintain and operate the

fleet according to the Airport's criterion. This is a high mileage, high fuel use fleet, accumulating approximately 1,125,000 miles and consuming 375,000 gallons of fuel annually. The Airport has the ability to require the contracted operator to use CNG through the RFP process and contractual agreement. Current fleet size is 22 buses, but the pending RFP is expected to require a fleet of 25 buses to meet increased demand.

The fleet has the potential to reduce NOx emissions by up to 32.04 tons/year when fully converted to CNG at a total incremental cost of \$1,000,000. These costs will be borne by the contractor and PHL, but funding assistance grants will be pursued to reduce economic impacts. The Airport will require the contractor begin the new contract agreement with operation of 100% CNG buses. This will result in an immediate conversion of a major fleet at PHL to CNG and will establish the primary anchor fleet for the AFV Program. This fleet and the new CNG station must be timed to ensure both are fully operational together in mid 2005. Conversion of this fleet will result in significant CNG fuel use, high public visibility for the Program, and a strong demonstration of the Airport's AFV and environmental leadership. The manufacturers CNG bus delivery schedule may dictate the Airport's final shuttle deployment schedule.

Action Items for Contracted Parking Shuttle AFV Deployment			
Activity	Airport Responsibility & Partners		Timeframe
Confirm AFV availability	WG	GPCCP, OEMs	Feb 2004 <sup>†</sup>
Budget for incremental bus/contract costs	FN, PR, OP	City of Philadelphia – Fleet Management	Feb 2004 <sup>†</sup>
Develop & release bus contract RFP w/ CNG use requirements	FN, PR, OP, WG	City of Philadelphia – Fleet Management	Mar 2004 <sup>‡</sup>
Review & select from RFQ responses	PR, OP, WG	City of Philadelphia – Fleet Management	May 2004 <sup>‡</sup>
Establish plan for maintenance and fueling	OP	City of Philadelphia – Fleet Management, PECO/PGW	May-Jun 2004
Negotiate final bus contract	PR, OP	City of Philadelphia – Fleet Management	May-Jun 2004
Pursue funding assistance	FN, OP, WG	GPCCP	Continuous
<i>WG=AFV Working Group; PR=Procurement; OP=Operations; FN=Finance/Budget; EX=Executive</i> <sup>†</sup> – Annually thereafter <sup>‡</sup> – As needed thereafter			

### **PHL Sweeper Fleet**

<i>Fleet Size:</i>	8
<i>Owner/Operator:</i>	PHL
<i>Annual Miles:</i>	800 per vehicle; 6,400 total fleet
<i>Annual Fuel Use:</i>	400 gallons per vehicle; 3,200 gallons total fleet
<i>Current Fuel:</i>	Diesel
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	0.06 tons/year
<i>Incremental Cost:</i>	\$25,000 each; \$200,000 total

<b>Primary Funding:</b>	PHL
<b>Fueling:</b>	At existing and/or new CNG station
<b>Key Partners:</b>	GPCCP, City of Philadelphia
<b>Fleet Timeline:</b>	Five to ten years

The Airport operates eight sweepers that remove debris and materials from the runways, airside tarmac and landside road network. These sweepers operate throughout the day for landside sweeping and primarily at night when sweeping the airfields. They do not operate during rain or snow, thus are intermittently/infrequently used during various times of the year (spring, winter). These vehicles travel slowly during operation, no more than 10-15 miles per hour, and accumulate relatively insignificant mileage annually. It is estimated they travel 800 miles and consume 400 gallons of diesel fuel annually each. Incremental costs vary greatly among manufacturers and sweeper type, but they average about \$25,000 more apiece for a total fleet replacement cost of \$200,000.

Due to recent regulations in California (SCAQMD Rule 1186.1) and other growing environmental trends in the sweeping industry, many new CNG model sweepers are now commercially available. Although these sweepers do not travel many miles, and thus will not make momentous impacts on fuel use or emission reductions, their conversion to CNG will provide the Airport with additional experience with CNG vehicles and operations. They will also be useful in demonstrating to the public the breadth of PHL's commitment and fleet integration of CNG vehicles.

<b>Action Items for Sweeper AFV Deployment</b>			
<b>Activity</b>	<b>Airport Responsibility &amp; Partners</b>		<b>Timeframe</b>
Confirm AFV availability	WG	GPCCP, OEMs	Feb 2004 <sup>†</sup>
Update procurement list with AFVs	PR, OP	City of Philadelphia – Fleet Management	Feb-Mar 2004 <sup>‡</sup>
Budget for incremental vehicle costs	FN, PR	City of Philadelphia – Fleet Management	Feb-Mar 2004 <sup>†</sup>
Develop AFV procurement specs (RFQ)	PR, WG	City of Philadelphia – Fleet Management	Mar-Apr 2004 <sup>‡</sup>
Release RFQ for vehicles & await response	PR, OP	City of Philadelphia – Fleet Management	May 2004 <sup>‡</sup>
Review and select from RFQ responses	PR, OP, WG	City of Philadelphia – Fleet Management	Jun 2004
Establish plan for maintenance and fueling	OP	City of Philadelphia – Fleet Management, PECO/PGW	May-Jun 2004
Pursue funding assistance	FN, OP, WG	GPCCP	Continuous
WG=AFV Working Group; PR=Procurement; OP=Operations; FN=Finance/Budget; EX=Executive			
† – Annually thereafter      ‡ – As needed thereafter			

## 2. Second Tier Targets

Once the Airport has successfully established the Tier 1 fleets, and the new CNG station, the AFV Program will focus on Tier 2 fleets. These second tier fleets are those that should not be targeted in the first tier activities, due to control or complexity issues, but are still strong targets for AFV use and will be able to make significant impact on the AFV Program. The success of the Tier 1 fleets will be leveraged to improve the success and impact of the Tier 2 fleet targets. Additional fleets may become viable Tier 2 targets in the future and will be added to this list as deemed appropriate.

### **PHL Medium/Heavy Duty and Offroad Vehicles**

<i>Fleet Size:</i>	88
<i>Owner/Operator:</i>	PHL (tenant and FBO fleets not included)
<i>Annual Miles:</i>	3,100 per vehicle; 272,800 total fleet
<i>Annual Fuel Use:</i>	620 gallons per vehicle; 54,600 gallons total fleet
<i>Current Fuel:</i>	Diesel
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	3.36 tons/year
<i>Incremental Cost:</i>	\$10,000-\$40,000 per vehicle; approximately \$1,760,000 total (at avg. \$20,000 per vehicle)
<i>Primary Funding:</i>	PHL
<i>Fueling:</i>	Existing and/or new CNG station
<i>Key Partners:</i>	PECO/PGW, OEMs, tenants/FBOs
<i>Fleet Timeline:</i>	10-20 years – during regular replacement schedule

The Airport operates a diverse fleet of 88 diesel-powered medium- and heavy-duty vehicles, providing a variety of operational support. These vehicles include dump trucks, tow trucks, van and stake body trucks, mowers, snow blowers and various pieces of emergency and fire equipment. Many are specifically designed and manufactured for unique uses and some never leave the airside portion of the Airport. These vehicles travel very few annual miles, some being seasonal equipment that are not used for long periods of time. Although there is great variety from vehicle to vehicle, the fleet averages just over 3,100 miles annually. The overall annual fuel use is similarly low, with approximately 620 gallons of fuel consumed by each vehicle and 54,600 gallons for the entire fleet.

Due to limited OEM availability the Airport's medium- and heavy-duty fleets are likely to rely more on conversions for AFV replacement. However, there are many CNG engines available from the major engine OEMs (see Appendix). The Airport will work with Program stakeholders to identify available OEM vehicles, engines and certified converters. Conversion kits and installation costs vary according to medium- or heavy-duty vehicle type, but typically these costs range from \$10,000 to \$40,000. This fleet target may not be completely converted to CNG, due to both the availability of applicable CNG engines and the possible exemption of some (i.e. emergency) equipment. However, if the fleet is fully converted to CNG it could reduce NOx emissions by 3.36 tons per year.

Action Items for Medium/Heavy-Duty AFV Deployment			
Activity	Airport Responsibility & Partners		Timeframe
Confirm AFV and engine availability	WG	GPCCP, OEMs	Aug 2004 <sup>†</sup>
Update procurement list with AFVs*	PR, OP	City of Philadelphia – Fleet Management	Aug 2004 <sup>‡</sup>
Budget for incremental vehicle and engine costs	FN, PR	City of Philadelphia – Fleet Management	Aug 2004 <sup>†</sup>
Develop AFV procurement specs (RFQ)	PR, WG	City of Philadelphia – Fleet Management	Sep 2004 <sup>‡</sup>
Release RFQ for vehicles & await response	PR, OP	City of Philadelphia – Fleet Management	Oct 2004 <sup>‡</sup>
Review and select RFQ responses	PR, OP, WG	City of Philadelphia – Fleet Management	Nov 2004
Establish plan for maintenance and fueling	OP	City of Philadelphia – Fleet Management, PECO/PGW	Sep-Nov 2004
Pursue funding assistance	FN, OP, WG	GPCCP	Continuous
<p>WG=AFV Working Group; PR=Procurement; OP=Operations; FN=Finance/Budget; EX=Executive  <sup>†</sup> – Annually thereafter    <sup>‡</sup> – As needed thereafter    * – Including available alternative fuel engines</p>			

### **Rental Car Shuttle Fleet**

<b>Fleet Size:</b>	70 (consolidated to 25)
<b>Owner/Operator:</b>	Currently by individual Rental Car Companies, consolidated operation to be operated under 3 <sup>rd</sup> party contract
<b>Annual Miles:</b>	52,000 per vehicle and 1,250,000 total fleet (consolidated 25 bus operation); 52,000 per vehicle and 3,500,000 total fleet (existing 70 bus operation)
<b>Annual Fuel Use:</b>	13,000 gallons per vehicle and 325,000 gallons total fleet (consolidated 25 bus operation); 8,000 gallons per vehicle and 560,000 gallons total fleet (existing 70 bus operation is mix of buses and cutaways)
<b>Current Fuel:</b>	Diesel
<b>Alternative Fuel:</b>	CNG
<b>Est. NOx Reduction:</b>	83.44 tons/year (consolidated); 56.72 tons/year (existing)
<b>Incremental Cost:</b>	\$40,000 per vehicle; \$1,000,000 total fleet (consolidated); \$2,800,000 (existing)
<b>Primary Funding:</b>	PHL/Contractor
<b>Fueling:</b>	New CNG station
<b>Key Partners:</b>	GPCCP, City of Philadelphia, fleet operator
<b>Fleet Timeline:</b>	Next contract or decision by PHL to consolidate

Approximately 70 diesel transit-style buses and cutaway shuttles transport passengers from the terminals to the rental car lots in circular loops. The rental car companies provide this service throughout the day as a convenience to their customers. Often they run back-to-back empty shuttles during the slow hours, to be immediately available to any potential customers (and as a form of “free” advertising at the Airport). In total,

there are roughly 70 rental car shuttles, which comprise approximately 35% of all commercial traffic at PHL, the largest use category of all commercial fleets.

The rental car shuttles are high mileage/high fuel use fleets, accumulating approximately 52,000 miles and 13,000 gallons of diesel each annually. The larger buses are replaced roughly every five years while the smaller cutaways are replaced every two or three years. As mentioned previously, these shuttles are responsible for a significant portion of the traffic, and thus vehicle emissions, at the Airport. The conversion of the existing fleet of 70 vehicles to CNG would result in substantial emission reductions of roughly 56.72 tons per year. However, the Airport may be better served by consolidating the rental car shuttle fleets, as is currently being done at many airports across the country. During this consolidation effort the Airport could readily require CNG use in the new fleet operation. The result would be a dramatic reduction in airport vehicular traffic and emissions. This simultaneous consolidation and conversion to CNG increases NOx emission reduction potential to 83.44 tons annually.

Consolidated rental car shuttles can also positively impact Airport security by reducing vehicular traffic (making it easier for police to survey the roadways), and placing vehicle operations into one entity (making oversight and control easier). It is highly recommended that PHL consolidate the rental car shuttle operations, possibly in tandem with Master Planning activities and/or moving the rental car operations offsite, to improve the efficiency, safety and air quality at the Airport.

A consolidated rental car shuttle operation would look very similar to the existing contracted parking shuttle operation. The Airport would place an RFP for a third-party contractor to provide the service, with operational criterion (including CNG use) detailed in the agreement. It is likely that a fleet of 25 transit-style buses could be deployed in their place, given current data, but further investigation is needed to determine the most efficient and effective fleet size, route and headways to ensure a high level of service for the rental car companies and their customers. This activity may face some opposition from the rental car agencies, fearful of reduction in service levels and/or the loss of free vehicle "advertisements, but with careful planning and communication the consolidated operations would be a benefit to all parties.

The Airport will need to begin the initial steps of this process soon, as the planning for fleet routes, RFP development, funding assistance, and reaching agreement with all of the rental car companies will take time. If the rental car agencies are going to be moved off airport due to the Master Planning process, this consolidated operation will be much easier to implement. Contacting other airports that have consolidated fleet operations, such as Baltimore-Washington or San Francisco, will be useful in guiding the Airport through this process.

<b>Action Items for Rental Car Shuttle Consolidation and AFV Deployment</b>			
<b>Activity</b>	<b>Airport Responsibility &amp; Partners</b>		<b>Timeframe</b>
Review Consolidation concept with Master Plan/Long-term outcomes and goals	EX, OP	Other airports	Sep 2004
Budget for incremental AFV costs	FN, PR, OP	OEMs	Oct 2004
Develop plan for consolidated option with CNG use requirement	EX, OP, WG	City of Philadelphia – Fleet Management, other airports	Oct-Dec 2004
Pursue funding assistance	FN, OP, WG	GPCCP	Aug 2004 - Continuous
<i>WG=AFV Working Group; PR=Procurement; OP=Operations; FN=Finance/Budget; EX=Executive</i>			

### 3. Third Tier Targets

In addition to the Tier 1 and Tier 2 target fleets for CNG introduction, several other fleets have potential for successful CNG integration at the Airport. These remaining fleets have been categorized into Tier 3 targeting due primarily to private fleet control and complexities in implementation. As the Airport establishes its AFV Program and expands its CNG experience it will turn its focus to these fleets to encourage and support their participation in the AFV Program. Successes and lessons learned from the Airports earlier AFV experience will be used to support the efforts of these fleets to convert to alternative fuels. Policy incentives will be reviewed to further assist AFV deployments in these fleets.

#### **Private Parking Shuttle Fleets**

<i>Fleet Size:</i>	70
<i>Owner/Operator:</i>	Privately owned/operated
<i>Annual Miles:</i>	40,000 per vehicle; 2,800,000 total fleet
<i>Annual Fuel Use:</i>	5,000 gallons per vehicle; 350,000 gallons total fleet
<i>Current Fuel:</i>	Gasoline and diesel
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	5.26 tons/year
<i>Incremental Cost:</i>	\$10,000 per vehicle; \$700,000 total fleet
<i>Primary Funding:</i>	Individual fleet owners/operators
<i>Fueling:</i>	New CNG station
<i>Key Partners:</i>	GPCCP, existing contract fleet operators
<i>Fleet Timeline:</i>	Five to ten years – during regular replacement schedule

Approximately 70 off-airport parking shuttles are estimated to be transporting passengers from private parking lots to the terminals. Most operate as a dispatch, or on-call, operation and all operate either cutaway shuttles or small buses. Fleet sizes vary from 7 to 14 shuttles. There is an equal mix of gasoline and diesel shuttles and most fuel at nearby public fueling facilities. Like the rental car shuttles, most private parking shuttle fleets have one or more backup vehicles that do not normally operate unless there is a breakdown or necessary repair.

This is another high mileage/high fuel use fleet, with vehicles averaging 40,000 miles and consuming 5,000 gallons of fuel annually. The total fleet target accumulates nearly three million miles annually and consumes 350,000 gallons of fuel. The vehicles are typically replaced every two to five years and maintenance is often outsourced to a local shop. If fully replaced with CNG models the fleet would reduce local NOx emissions by roughly 5.26 tons per year.

The Airport has several mechanisms available to encourage the private parking shuttle fleet to switch to AFVs. The most cost effective and non-intrusive measure is to financially incentivize AFV use. This can be done by reducing the permitting cost of CNG fleets, or increasing the cost of those remaining with conventional fuels. Another policy option is to establish Airport access fees and develop similar preferred pricing mechanisms for AFVs. This mechanism can be used to encourage AFV adoption by all commercial fleets at the Airport, and since even the reduced AFV fees will be new revenues for the Airport, there is no economic loss attributed to this approach. The key to successful incentives is ensuring there is enough of an economic incentive to the fleet operator to make an AFV investment worth the time and effort.

### **Hotel Shuttle Fleet**

<i>Fleet Size:</i>	40
<i>Owner/Operator:</i>	Mix of hotel and third party owner/operators
<i>Annual Miles:</i>	40,000 per vehicle; 1,600,000 total fleet
<i>Annual Fuel Use:</i>	3,000 gallons per vehicle; 120,000 total fleet
<i>Current Fuel:</i>	Gasoline
<i>Fuel Choice:</i>	CNG
<i>Est. NOx Reduction:</i>	15.80 tons/year
<i>Incremental Cost:</i>	\$10,000 per vehicle; \$400,000 total fleet
<i>Main Funding Source:</i>	Hotels and shuttle contractor
<i>Fueling:</i>	New CNG station
<i>Key Partners:</i>	GPCCP, existing parking and shuttle contractors
<i>Timeline:</i>	5 to 15 years, depending upon approach

Many of the area hotels offer their guests courtesy shuttle service to and from the airport and hotel. This is an on-call service where quality of service is more important than operational costs. Service is typically provided through a third party contractor, although some hotels operate their own vehicles. Most hotels are served by a fleet of one or two shuttles, or slightly larger for fleets servicing more than one hotel.

These shuttles accumulate relatively high mileage, averaging 40,000 miles per vehicle annually and 1.6 million miles cumulatively for the entire fleet. This translates into approximately 3,000 gallons of gasoline individually and 120,000 gallons for the total fleet each year. If all 40 shuttles are converted to CNG, emission reductions will be roughly 15.80 tons of NOx annually.

Another option for reducing total fleet emission, and airport landside vehicle congestion, is to consolidate the hotel fleets into a smaller, singularly controlled fleet for all of the area's hotels. With the congregation of hotels along Bartrem and Island Avenues next to the Airport, and another grouping along Industrial Highway, a few consolidated

shuttle routes could effectively serve most all of the nearly two dozen hotels in the immediate four-mile radius (see Appendix). This would eliminate this non-primary operation (and overhead) of the hotels currently operating shuttle fleets, and allow those currently without shuttle operations a new service. The approach to consolidating the hotel shuttle fleet would be similar to the contracted parking shuttle or rental car shuttle fleets, where a competitive bid process is released and a third party operator provides the service according to criterion established by the hotels, and possibly the Airport.

If consolidation efforts are not pursued, the Airport can support hotel shuttle fleet conversion to CNG through incentives in access fees, airport permits, and/or discounted fuel pricing.

### **Taxis**

<i>Fleet Size:</i>	40
<i>Owner/Operator:</i>	Private companies and operator/owners
<i>Annual Miles:</i>	75,000 per vehicle; 3,000,000 total fleet
<i>Annual Fuel Use:</i>	5,000 gallons per vehicle; 200,000 gallons total fleet
<i>Current Fuel:</i>	Gasoline
<i>Alternative Fuel:</i>	CNG
<i>Est. NOx Reduction:</i>	5.00 tons/year
<i>Incremental Cost:</i>	\$5,000 per vehicle; \$200,000 total fleet
<i>Primary Funding:</i>	Owner/operators
<i>Fueling:</i>	New CNG station
<i>Key Partners:</i>	OEMs, GPCCP
<i>Fleet Timeline:</i>	10 to 20 years – during regular replacement schedule

There are numerous taxi companies providing service to the Airport, with nearly two dozen providing frequent daily service. Specific fleet data for these taxi fleets is not available, but taxis are typically very high mileage, high fuel use fleets [the statistics presented above, for comparison purposes, are characteristic of other airport taxi fleets]. Conversion of taxi fleets to CNG would likely produce considerable emission reductions. A number of airports across the country have targeted taxi fleets for AFV conversion because of this emission reduction potential, many with hundreds of converted taxis in operation.

However, because even taxis dedicated to serving the airport travel throughout the surrounding region, taxis are often more likely to fuel away from the airport than near it. This makes this market a difficult target, especially if the region does not have sufficient regional infrastructure for the alternative fuel. Currently the Philadelphia area has several regional CNG stations, but not enough to be considered widespread. Another factor somewhat unique to this fleet target is the owner/operator nature of the taxi industry. Often times the drivers, who negotiate with the taxi company to provide service under their name, individually own the vehicle. This creates difficulties in vehicle purchases, as the Airport must now deal with numerous fleet owners rather than one (or a small handful). While this may make the taxi market difficult to target, strong incentives for CNG conversion (as done at other airports) may result in notable CNG taxi deployment. In addition to preferential access and permit fees, other airports have

introduced “front of line” queuing for AFV taxis. This approach has greatly influenced AFV use in taxis due to the significant economic impact it has on taxi operations.

### **Airside GSE and Service Trucks**

There are an estimated 600 GSE and 200 service trucks operating on the airside of the Airport. These vehicles provide a vast array of services and are often custom built to meet specific fleet needs. The GSE include belt loaders, tugs, pushbacks, and GPUs while the service trucks include catering, fuel, water, and lavatory trucks. These are typically owned by the airline or a fixed-base operator (FBO). While these vehicles do not travel great distances, they do idle on the tarmac for a good portion of the day, resulting in relatively high fuel use and emissions. Converting these vehicles to electric power (GSE) and CNG fuel (service trucks) could dramatically reduce emissions. Electric charging support could be developed during terminal and gate upgrades/construction and CNG fueling will be readily available after development of the new CNG station on Island Avenue.

Successful AFV deployment in these fleets will require strong partnerships. To fully communicate the benefits of AFV use, the Airport will likely need enough lead time for these operators to fully understand and “buy into” the process and AFV Program. The Airport must also work with the fleet operators on reducing overall costs, which is of critical concern in the current economic climate. Therefore, the Airport should begin discussions soon, especially prior to or during any major airside developments (i.e. Master Planning activities) to ensure the long-term buy-in of these fleet operators. The current FAA reauthorization, with the expected emission reduction credit language, will be an important factor in these discussions.

### **Construction equipment**

There are numerous heavy duty and offroad construction vehicles and equipment operating at the Airport at any given time. This will only increase as the Airport prepares and implements the projects identified in the developing Master Plan. The majority of these vehicles will be diesel-powered, some not leaving the Airport for months or more depending on the project and fleet type. As uncontrolled, off-road equipment these vehicles will produce significant emissions during their construction activity at the Airport.

During the negotiation of these construction project contracts, the Airport will have the opportunity to influence fuel choice. Many, if not all depending upon fuel choice, may be good targets for alternative fuel use. When these opportunities arise, the Airport should investigate and require, when feasible and appropriate, the use of cleaner alternative fuels. Aside from the use of CNG, which the Airport will be developing additional fueling capabilities, the opportunity to use B20 biodiesel is also strong considering it can be used in any diesel-powered engine with no additional modification.

### **Cargo Vehicles and Equipment**

Cargo operations at PHL are very important, with nearly 600,000 tons of cargo handled annually and cargo accounting for 20% of all jobs at the Airport. Dozens of cargo airlines, freight forwarders, and custom brokers are located at PHL, including all the

major package delivery companies such as UPS, FedEx, Emery, DHL and Airborne Express. These cargo operators operate a very large, but thus far uncounted, number of trucks and GSE each day. Many of these vehicles never leave the Airport, while others travel in predictable patterns transporting their cargo to/from the Airport to nearby distribution facilities. This fleet type likely contains many good targets for AFV integration and may result in significant emission reductions. However, it will require substantial investigation and vehicle characterization to better understand fleet potential for conversion to alternative fuels. One advantage is that many of these companies have experience in alternative fuels at other locations, thus there is experience to build upon, albeit from another location.

### C. Outcomes and Implementation Schedule

The Airport will use a multiyear, three-tier approach to AFV fleet integration efforts. Initial focus will be on fleets the Airport owns and operates, or has direct control over through contract agreements, allowing the Airport to increase its AFV experience while simultaneously demonstrating its AFV and environmental leadership. As these fleets become established, attention will focus on second tier fleets that are (or will be) under Airport control but have additional deployment complexity or reduced AFV availability, compared with Tier 1 fleets. This allows the AFV Program to expand in an incremental and coordinated approach that will enhance the likelihood of AFV deployment and Program success.

Two of the three Tier 1 fleets are under direct Airport control and can be actively pursued through modification of the existing procurement process. These revisions, which are to be repeated for all of the Airport owned/operated fleets, include:

- Inclusion of AFV options in Airport procurement lists (with City of Philadelphia),
- Revision of RFQ and procurement documents to preference AFV purchases,
- Revision of annual budgets to account for AFV incremental costs, and
- Inclusion of AFV training and maintenance needs in ongoing operations.

The Airport will also need to begin pursuing funding assistance to reduce the economic impact of the incremental costs of AFVs and updating other Airport policies to support, instead of hinder, future AFV purchases and use at the Airport.

The most critical element in the Tier 1 target list will be the contracted parking shuttle fleet. This fleet consumes significantly more fuel than the other Tier 1 targets and will be the anchor for the new CNG station and all of the Tier 1 fleets. Unlike the other Tier 1 targets, this fleet is not actually owned and operated by the Airport directly, rather it is a service provided under a contract agreement. *This contracted parking shuttle service contract is currently being developed for release in early 2004 and it is critical that the new RFP include a CNG use requirement.* If this does not occur the fuel throughput of the AFV Program will be severely reduced, seriously impacting CNG station design and development, and AFV deployment in this fleet will not again be available for many years. Final deployment of the new parking shuttle operation is to be complete within two years, resulting in these vehicles being in service by mid 2005. This makes this

fleet deployment schedule the critical milestone for Tier 1 fleet deployments and the development of the new CNG station.

As Tier 1 fleet integration takes root, the Airport should proceed with a similar approach for Tier 2 fleets. This multiphase approach to fleet integration will allow the Airport to focus on achievable objectives that can be easily expanded to additional fleets and Program activities. The Tier 2 medium- and heavy-duty Airport vehicles will be targeted similarly to the Tier 1 Airport-owned fleets, with the only significant variance an increased reliance on engine conversions. The other Tier 2 fleet, consolidated rental car shuttles, will require a significantly different approach, but is as critical to the AFV Program (as well as CNG throughput and station design) as the contracted parking shuttles are to Tier 1 fleets. While the overall fleet size and operating characteristics of the rental car shuttle fleet closely matches the contracted parking shuttle fleet, the issue of ownership and fleet operations is completely different.

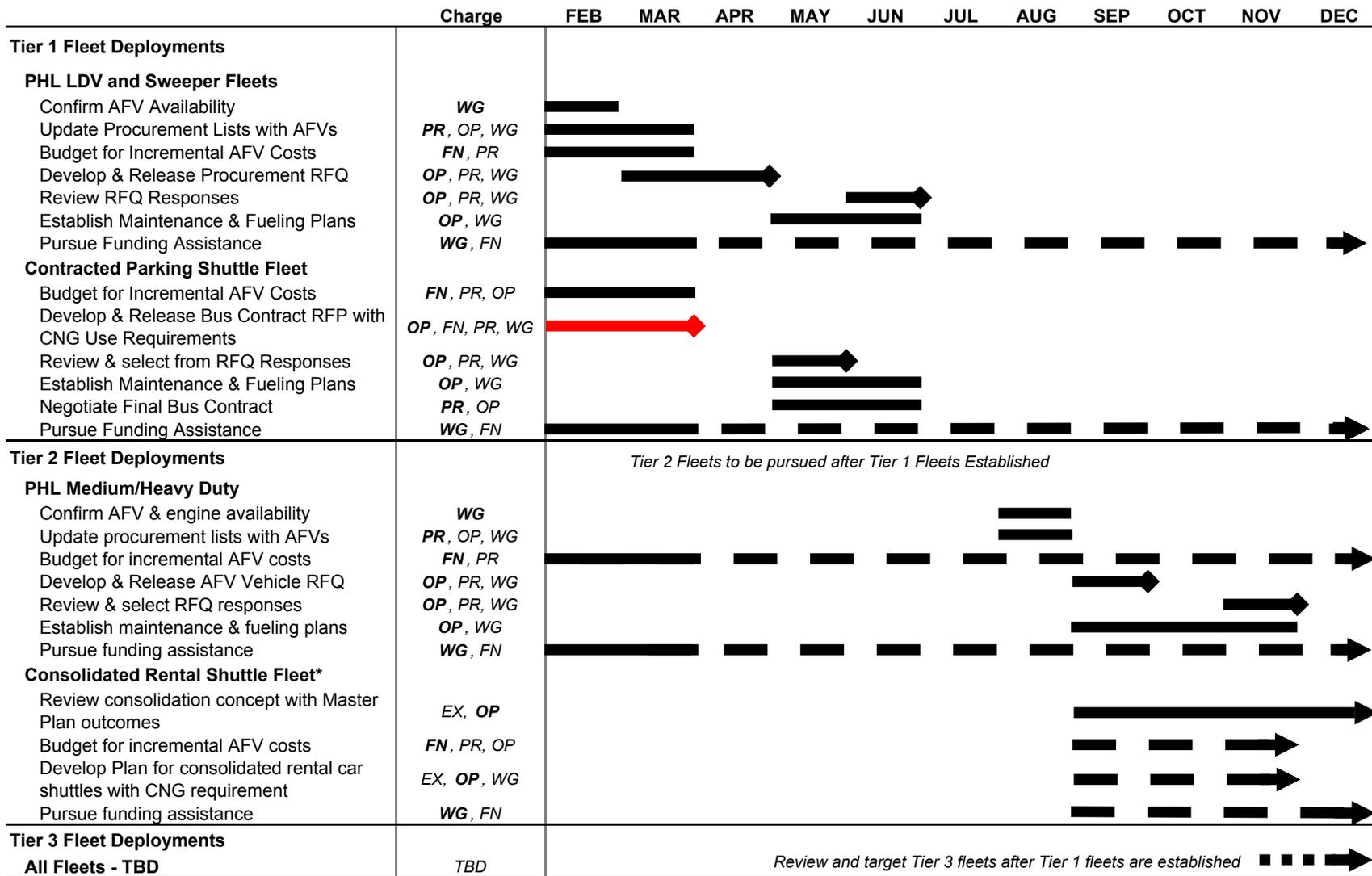
Currently each rental car company owns and operates its own rental car shuttles, resulting in a significant redundancy of fleet vehicles, increased vehicular congestion and additional emissions. Due to potential improvements in all of these areas, as well as Airport security, the Airport should consolidate these shuttle operations into one service (and possibly move all rental car companies off-airport). While this is a major development for the Airport, it likely fits well in the current Master Planning efforts and is a trend occurring at airports across the country. Although this is a Tier 2 activity – the *Airport should begin planning for rental car shuttle consolidation and AFV use now* to advance this activity for implementation in the near future.

Below is a list of critical action items for fleet deployment, with a more detailed schedule outline presented on the following page. The proposed action items include a timeline for AFV fleet deployments and the persons or departments responsible for overseeing each task.

#### **Action items for fleet deployment**

- Develop and release Bus contract bid with CNG use requirements  
*Deliverable Date – Feb 2004 / Charge – Keith Brune, Operations*
- Revision of procurement documents and processes to require AFV purchases  
*Deliverable Date –Feb-Mar 2004 / Charge – A. Moore, Maintenance*
- Revision of annual budgets to account for AFV incremental costs  
*Deliverable Date – Feb-Mar 2004 / Charge – PHL Finance Dept.*
- Inclusion of AFV training and maintenance needs in ongoing operations  
*Deliverable Date – Feb-Mar 2004 / Charge – J. Pawlowski, Fleet Services*
- Investigate and pursue consolidation and AFV use in rental car shuttle operations  
*Deliverable Date – Feb 2004 / Charge – AFV Champion & Working Group*
- Pursue funding assistance  
*Deliverable Date – Feb 2004 / Charge – AFV Champion & Working Group*

### Proposed 2004 Timeline for Fleet Deployment



Charge, with Key Responsibility in **BOLD**: EX = Executive Staff; OP = Operations; EN = Environmental; LG = Legal; PR = Procurement; FN = Finance/Budget; MK = Marketing; CH = Airport AFV Champion; WG = AFV Working Group

\* Consolidation efforts dependent upon Master Plan Outcomes

Critical (time sensitive) activities listed in **RED**

## V. INFRASTRUCTURE

The development of an adequate refueling infrastructure for an alternative fuel program is critical, and the Airport will focus early efforts on ensuring that sufficient infrastructure is successfully established to support the Airport's AFV initiatives. The Airport currently owns and operates a CNG station located at the fleet maintenance facility. This station was built to support a small fleet of shuttles and light-duty vehicles and is in good condition. However, there are several improvements that can be made that will allow it to better serve the Airport's needs. Much of this report, and the process behind it, is centered on ensuring that any station is built along with a supporting AFV fleet implementation plan. The Airport is fully committed to making certain that this CNG station is successfully established and an effective AFV Program Plan is simultaneously implemented.

### A. Existing CNG Station

The existing CNG station was built approximately five years ago and is in good operating condition. It was designed/built by IMW Atlas as a skid-mounted system with 120 scfm capacity and over 16,000 scf of usable storage capacity. It utilizes a Hurricane compressor that provides both 3,000 and 3,600 PSI fueling pressures and a 150 scfm dryer. The station has a double hose, single meter system and was built to support a small fleet of shuttles and light-duty vehicles, the latter of which still use the facility today.

The fueling capacity of the existing station can support the Airport's Tier 1 LDV and sweeper fleets once they are converted to CNG, but will not be able to handle the fueling needs of the contracted parking shuttle fleet. The existing station will require roughly 23 hours to refuel the entire fleet of 25 shuttles, which is unacceptable for routine service and individual bus fill time. The station is well suited for light- and medium-duty vehicle fill and emergency use should the new station be out-of-service. Therefore, the new CNG station will need to be established before this parking shuttle fleet is deployed in 2005. The existing station's fueling capability could be expanded through additional storage vessels, but the 120 scfm compressor (and 150 scfm dryer) essentially limits the station's ability to expand to meet the necessary fueling needs.

Due to the current stations limited compressor size, the RFP for the proposed new station should be designed to support the fueling requirements for both Tier 1 and Tier 2 fleets, and should be designed for ready expansion. Instead of relocating the existing station, the Airport may be better served by undertaking limited improvement measures and leaving it on the west side of the Airport. Potential improvement recommendations include upgrading the current dispenser to new heavy-duty/bus dispenser standards (Sherex 5000 or equivalent), thus allowing the station to provide for the light-duty fleets and some complimentary fueling for the bus and heavy-duty fleets. While the existing dispenser can fuel these vehicles, its lower rate of flow limits the speed in which bus and heavy-duty vehicles can be refueled. Updating the existing station with the bus/heavy-duty dispenser could be done in such a manner that the station continues to use the existing dispenser but adds the new dispenser to the other end of the platform,

thus allowing simultaneous fueling of two vehicles. This would increase the existing station's ability to support the expanding CNG fleet and provide additional fueling options on the Airport's west side.

The existing station is currently maintained through a contract with a third party service provider that also provides similar service to PECO Energy for its CNG stations. This has worked well, but it may be more cost efficient in the future to have one contract provide maintenance for both stations, when the new station is complete.

## **B. New CNG Station Development**

The Airport is committed to building a new CNG station to support its expanding AFV Program. This station will be primarily funded by the \$1.8M in grant funds secured by the Airport and its AFV Program partners. The proposed station location has been identified as a parcel of land on Island Avenue south of Interstate 95, easily accessible to local and regional fleet vehicles. It can also provide for future airside fueling, should the Airport decide to pursue these fleets. The CNG station will be designed to support the immediate Tier 1 and short-term Tier 2 fleets, as well as readily accommodate future station expansion efforts to support other fleet targets.

There are two different prevalent approaches to developing a new CNG station, either through the traditional engineering Design/Bid/Build process or through a Service Performance approach. The Airport can either refine the existing engineering Design/Bid/Build specification documents, from a previously released RFP, or develop a Service Performance-type specification document and release it.

### **1. Traditional Engineering Design/Bid/Build Contract**

One option for the CNG station development is to solicit a traditional engineering design and then bid/build RFP process, as has been done previously at the Airport. This type of RFP directly specifies most aspects of the design, construction and layout of the station. The advantages include the Airport has already developed a specifications document for this type of RFP and can use it, with modifications outlined below, with little difficulty, and the Airport is most familiar with this design approach. The Airport also knows exactly what the responses will look like and is assured that the final station design will conform to all stated specifications.

A disadvantage of the more traditional engineering design process is that in specifying the equipment and design approach little flexibility is offered to potential bidders, generally increasing their costs and the costs passed on to the Airport. This inflexibility prohibits contractors from using similar design layouts and/or equipment that meet all of the Airports' needs yet reduces costs, thereby lowering overall station costs. Design fees are also substantially reduced. Several contractors have mentioned this issue as a major reason why their proposals on earlier Airport CNG station development efforts were relatively high.

With inflation likely to further increase the overall costs of the CNG station design and construction, compared to the previous responses of several years ago, and no other significant change in the RFP, proposals submitted under another traditional engineering process format will likely result in similar responses that will not produce the desired cost saving result for the Airport. While the scope of this document does not allow for detailed review and subsequent recommendations for these specifications, if the Airport does wish to pursue the traditional engineering RFP process, some suggestions are provided below.

### Recommendations for Existing CNG Station Specification Document

- Section 15100-3 Specifies that the compressor and storage equipment “shall be sized ... to simultaneously fuel 5 commercial buses and 2 light-duty vehicles.... [and that the] fueling cycle shall be 10 minutes for each Bus and 6 minutes for each Light-Duty vehicle.” These specifications do not specify what happens when another bus or light-duty vehicle expects to refuel immediately after, i.e. the 6<sup>th</sup> bus and/or 3<sup>rd</sup> LDV arrives to refuel. Increasing the storage or compressor capacity, with the latter being recommended, addresses this.
- Section 15100-7 Update/enlarge OEM equipment list to include other acceptable options.
- Section 15100-10 Include language to require larger fittings and raceways for wires, pipes etc to allow for later expansion of station. (Tier 2, Tier 3 or beyond)
- Section 15110-1 Update/enlarge OEM equipment list to include other acceptable dryer options. Include specifications that either allow room for later expansion of dryer equipment, or, preferably, require larger dryer size from onset to account for later station/compressor expansion and/or redundancy. One larger dryer is more cost effective than two smaller ones.
- Section 15120-1 There are no redundancy/backup measures required, leaving vehicles stranded if the single compressor goes out (except for the existing 120 scfm compressor/station). Require equally sized redundant compressor system for backup.
- Section 15130-1 Change wording to require Sherex equipment “or equivalent”.
- Section 15160-1 Update/enlarge OEM equipment list to include other acceptable options.
- Review all areas specifying OEM equipment and expand product availability to improve bidder flexibility in OEM equipment choice and overall costs. Inclusion of “or approved equivalent quality product” language is another acceptable solution.
- The mechanical equipment (fueling compressor/drive and dryer) located on the center fueling island should be moved to the area where the CNG storage containers are located. This will allow the equipment to remain on the three-foot elevated concrete slab (Elevation drawings C-5 and S-2) for flood control requirements and allow the fueling dispensers to be positioned at a normal vehicle-level height. Overhead fueling lines between compression equipment and dispensers are preferred.
- The relocation of the mechanical equipment allows the width of the fueling islands to be reduced, thereby allowing vehicles to use the dispensers from either side of the island, as with traditional fueling island dispensers. This is also a consideration for station planning in general.
- Require relocation of existing CNG station to be a line item option, allowing the Airport to determine the cost effectiveness of this option. Any relocation of this fueling island should allow for best possible access to dispensers (i.e. avoid placement in middle of islands).
- Location of fueling dispensers should allow enough room to fuel multiple vehicles simultaneously and allow for additional dispensers to be added in the future
- All conduits and raceways should be properly sized to accommodate future expansion and dispenser and related cutouts plumbed to easily accommodate future expansion of the station.

## 2. Service Performance Contract

In a Service Performance approach, the Airport releases an RFP that requires bidders to meet the functional fueling and capacity requirements of the fleet as determined by type and number of fleet vehicles and their fueling patterns. Specific technical criteria requirements on the equipment, such as compressor size and storage capacities, are not specified. This approach ensures that the fueling needs of the Airport's fleet are met while simultaneously allowing potential bidders flexibility in station design and development. Use of this performance approach to station development has become more frequent and has helped spread development risks while lowering overall costs.

The two keys to a successful Service Performance specification are a solid AFV deployment plan for fleets and a sound agreement between the fleet operator (Airport) and the station designer/builder/operator (third party). The vehicle deployment plan must explicitly detail the performance requirements of the expected CNG fleets to ensure prospective bidders understand fleet needs and develop station plans that will meet all fueling requirements. The final agreement between the Airport and the winning bidder must address all relevant fueling issues and elements, including default clauses and penalties, so that both parties have a complete understanding of how the station will be designed, built, operated and maintained over the life of the agreement.

Vehicle deployment details are found throughout this document, however the following information will be essential to bidder understanding of the Airport's fueling needs.

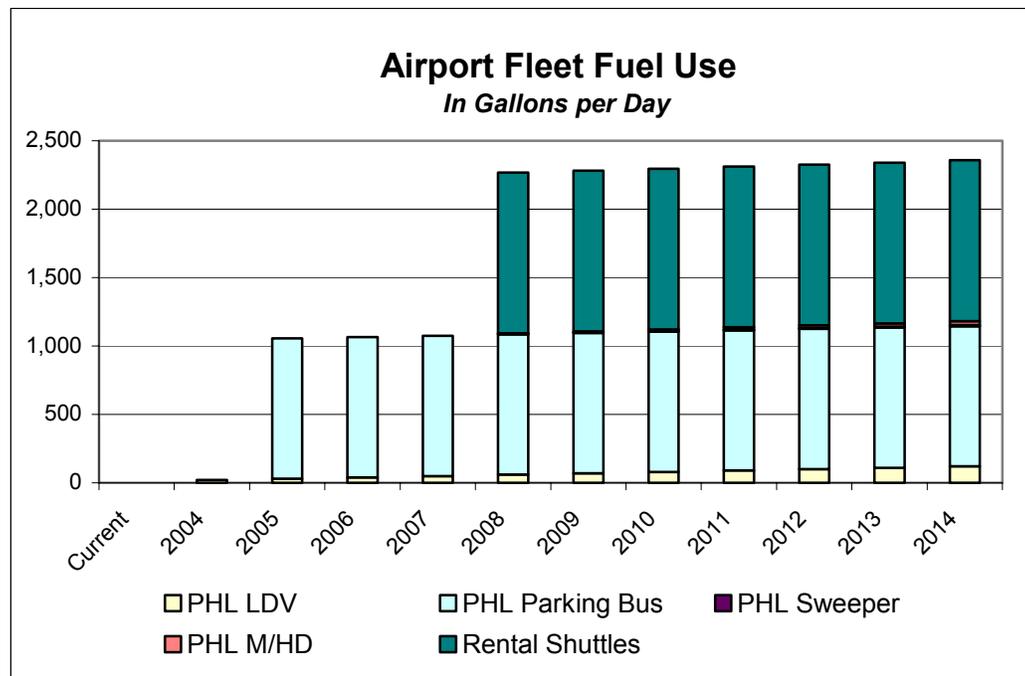
### Example PHL Fleet Fueling Characteristics & Requirements

	2005	2008	2011	2014
<b>Fleet Size</b>	25 Bus 15 LDV	50 Bus 30 LDV 6 M/HD	50 Bus 45 LDV 12 M/HD	50 Bus 60 LDV 18 M/HD
<b>Daily Fleet Fuel Use</b>	1030 dge	2072 dge	2114 dge	2156 dge

- Daily DGE Fuel Requirements: Bus = 50; LDV = 2; M/HD = 2
- Fuel Dispenser Requirements: four 3600 psi bus nozzles and two 3000 psi LDV nozzles
- Max Time to Fuel Vehicles: Bus = 7-10 minutes; LDV = 3 minutes
- Minutes Between Fueling: 2.5 minutes each

*\* does not account for additional non-PHL (public) users*

These predicted fleet fueling characteristics and requirements will be the crux of the Service Performance RFP specifications. They are based upon the previous fleet characteristics and fleet deployments of five LDVs and two M/HD vehicles annually. As a Tier 1 fleet, LDV deployments begin in 2005; while Tier 2 M/HD fleets begin deployment in 2007. Sweeper deployments are integrated into the M/HD vehicle deployments, due to insignificant individual impacts on total fuel use. These relatively conservative fleet deployments for the LDV and M/HD fleets reflect possible obstacles, such as financial restraints, that may be encountered during the Program. The two bus fleets, as seen in the following Fleet Fuel Use graph, will be the primary fuel drivers for the CNG station and AFV Program and will be the basis for CNG station design.



To better estimate and assure accurate station design and operation costs, many third-party bidders will expect minimum fuel volume commitments, often termed as a “take-or-pay” agreement. These ensure the operator will be able to recover expenditures/generate profits over the lifetime of the agreement through the expected fuel sales revenues. The Take-or-Pay agreement establishes a baseline of fuel throughput volumes that the Airport will meet, either “take” in fuel demand, or “pay” regardless if the Airport uses below that amount. Often these baselines are calculated as a percent of the expected fuel demand (50-75%) to account for vehicle procurement delays, vehicle downtimes or other obstacles beyond the Airport’s control. Establishing expected and minimum fuel demand levels allows the third-party fuel provider to establish final fuel prices for the CNG station.

The final agreement must also address final CNG prices, for the Airport, tenants and other potential station users. Final fuel price will be affected by seasonal natural gas prices, taxes, compression charges, operating and maintenance costs, and operator margins. The Airport will want to negotiate their own fleets final fuel prices, which may be different than that charged to other users, according to nearby CNG station pricing, by tracking gasoline/diesel prices, as a percentage over operator margins, or at a fixed rate over the years. Often third-party contracts state the minimum monthly fuel volumes (take or pay) with a second baseline volume that if surpassed will result in reduced fuel prices for the Airport. This provides both parties with incentives and bonuses for maximizing fuel use (the Airport acquires reduced fuel prices, the third-party sells more fuel). This highlights the vested interest the third-party has in marketing to and expanding AFV deployment, thus their role as a strong partner in the AFV Program. Often the third-party will independently market to regional fleets to increase total fuel throughput.

Preparation and release of a Service Performance specification by the Airport requires minimum resources for document development beyond the AFV Program plan and previously developed documents. With an RFP that properly describes key fleet operating characteristics and fueling requirements the onus of station design and development is placed upon the bidders. Bidders are given great flexibility in how they design and construct the CNG station, so long as they meet the fueling needs of the Airport. The following Service Performance Criteria list reviews the key elements that must be addressed/included in the RFP and final agreement.

### Primary Service Performance Criteria

#### Site and Construction Criteria

- Area available for development
- Area layout and requirements (number of islands and dispensers)
- Gas supply details (pressure, flow rates, fuel specification)
- Location and availability of gas, electric and telephone
- Definition of site construction items (costs and responsibility)

#### Fleet and Service Criteria

- Types of vehicles (heavy/light-duty)
- Total volume of expected/guaranteed fuel
- Vehicle pressures (3,000 and/or 3,600)
- Connector types (Sherex 5000 for HD/buses, NGV-1 or Sherex 1000 for LDV)
- Station compressor operating pressure
- Fleet fueling patterns (what time of day, how many at a time/per hour, parallel or sequential services, primary fueling hours or fueling window)
- Fuel pricing (what costs are “passed through” vs. negotiated, agreement on compression charges, minimum annual volume commitments – take or pay)
- Term of contract (typically minimum of 10 years)
- Final station ownership and control
- Financial penalties for missing performance criteria/potential default by either party
- Schedule of implementation (construction) and final station testing requirements
- Plans for electric power outage
- Special pavement and/or fencing requirements (flood plain considerations, airside access)
- Gas supply flow rates and moisture specifications
- Total funding assistance available
- System redundancy potential

## C. Outcomes and Implementation Schedule

It is *strongly recommended that the Airport use a Service Performance approach to RFP development for CNG station construction*, rather than a traditional engineering specification. Development and release of the latter is unlikely to result in anything more successful than before, while the former will likely allow the Airport to obtain a larger CNG station, meeting both Tier 1 and Tier 2 fueling needs, at a relatively lower cost. This approach is also preferred because of the increased speed with which it can be developed and released, and *timing is of critical importance considering the contracted shuttles are to be deployed in mid-2005.*

To initiate the Service Performance RFP process, the Airport needs to release a Request for Expressions of Interest (RFI), or a pre-qualification process for bidders. This will advertise the Airport's pending station development RFP and ensure that all final bidders have the capabilities and resources to successfully respond to the RFP. Bidders shall be able to prove they have the financial capability to undertake this project, are properly bonded with appropriate insurance, have direct experience in developing/operating similar stations, and have all proper licenses and documentation. The following implementation timeline outlines the proposed action items for CNG station RFP development at the Airport and the departments and divisions responsible for overseeing each task.

With the criteria outlined previously, the RFP responses will likely result in an 800 scfm dual compressor system with minimal storage capacity (45,000 to 60,000 scf) for buffering purposes. If all of the buses (50) require full tank refills and fuel sequentially (back-to-back) during the overnight fueling window it would take the expected system 6-7 hours to refuel all the vehicles. Considering not all of the vehicles are likely to require full tank refueling nor would all vehicles fuel solely during this timeframe, such a system would effectively support the Airport's expected CNG fleet. The other Tier 1 and Tier 2 fleets (LDV, sweepers, M/HDVs) will not significantly impact fueling capacity or fueling time; as they are fewer in number, use less fuel, are likely to refuel during daytime hours, and will be able to use either the new or existing CNG station. To obtain a CNG station that will meet all of these fleet requirements, the Airport should use the previously outlined criteria and require bidders to anticipate a back-to-back vehicle fueling scenario. This will result in some over-design of the station, especially in the years prior to rental car shuttle consolidation, but it will maximize long-term capabilities and success.

Below is a list of critical action items for CNG station development, with a more detailed schedule outline presented on the following page. The proposed action items include a timeline for CNG station development and the persons or departments responsible for overseeing each task.

#### **Action Items for CNG Station Development**

- Prequalify potential CNG station bidders  
*Deliverable Date – Feb 2004 / Charge – AFV Champion Calvin Davenger*
- Develop and release performance-based CNG station RFP  
*Deliverable Date – Feb-Mar 2004 / Charge – AFV Champion Calvin Davenger*
- Contact other airports with relevant CNG station experience  
*Deliverable Date – Feb-Mar 2004 / Charge – AFV Champion Calvin Davenger*

**Proposed CNG Station Development Timeline**

	Charge	2004				2005					
		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC	JAN-MAR	APR-JUN	JUL-SEP	OCT-DEC
<b>Prequalify Bidders</b> Develop and Release RFQ Review & Finalize Bidder List	OP, LG, CH, <b>WG</b> OP, LG, CH, <b>WG</b>										
<b>Develop Service Performance RFP</b> Contact other airports w/ experience Develop and Release RFP Bidder Response Time for RFP Review RFP Responses Select Winning Bidder  Negotiate Final Contract with construction schedule & final station testing mechanisms Develop Construction Schedule and Final Station Testing Mechanisms Sign Final Contract Agreement	EX, <b>CH</b> , PR, WG EX, <b>OP</b> , LG, CH, WG EX, <b>OP</b> , FN, CH, <b>WG</b> EX, <b>OP</b> , FN, CH, <b>WG</b> EX, <b>OP</b> , LG, CH, WG  EX, <b>OP</b> , LG, CH, WG EX, <b>OP</b> , LG, CH, WG EX, LG, <b>OP</b> , CH, WG										
<b>Initiate CNG Station Construction</b> Actively Track Station Development Completion of CNG Station	<b>OP</b> , CH, WG <b>OP</b> , CH, WG										
<b>Begin CNG Station Operation</b> Conduct Final Station Tests Accept Final Station Construction Hold Public Kickoff Event	<b>OP</b> , CH, WG EX, <b>OP</b> , LG, CH, WG EX, <b>MK</b> , <b>OP</b> , CH, WG										

Charge, with Key Responsibility in **BOLD**: EX = Executive Staff; OP = Operations; EN = Environmental; LG = Legal; PR = Procurement; FN = Finance/Budget; MK = Marketing; CH = Airport AFV Champion; WG = AFV Working Group  
 Critical (time sensitive) activities listed in **RED**

## VI. POLICY DEVELOPMENT

The foundation of any AFV Program is the set of policies established to sustain it over time. These policies, integrated into all aspects of airport organization and operations provide the direction and guidance for a successful AFV Program. The Airport will establish policies that support AFV deployments by the Airport fleets, tenants, and the surrounding community and regional fleets. They will be incorporated into all aspects of airport operations and processes – from planning and purchasing to operation and equipment retirement.

The Airport will develop a variety of policy approaches to expand AFV fleet deployments, including policies that encourage, promote, provide incentive mechanisms (economic or other), and/or mandate AFV use. These policies will be developed for PHL fleets, airport tenants and the general public, as deemed necessary, to support and expand the Airport's AFV Program. They may also include outreach and communication activities designed to expand and support the Airport's AFV operations.

### A. PHL Controlled Fleets and Operations

The Airport will employ the most effective policy measure to expand AFV fleet use – mandates – for fleet vehicles over which it has direct control. This will provide an immediate footing for the AFV Program and serve as a demonstration of the Airport's environmental and AFV leadership to others. Additional Airport policies will be developed to expand AFV integration at the Airport through training, education, and outreach initiatives. The Airport will review adoption of the following Airport fleet policy initiatives, in coordination with the City of Philadelphia, to develop this essential foundation for the Airports' AFV Program.

- Revise all vehicle procurement processes to mandate AFV purchases during regular light-duty vehicle and sweeper replacement, unless granted special emergency waivers
- Update procurement lists
- Update budgetary processes
- Update maintenance procedures/capabilities
- Revise all vehicle procurement processes to mandate AFV purchases or conversions during regular medium- and heavy-duty replacement schedules, unless granted special emergency waivers, or through a selective process
- Revise all pending fleet operations contracts (i.e. contracted parking shuttles) to include AFV use requirements.
- Require all Airport mechanics receive and maintain proper AFV training and certification
- Develop internal Airport AFV education and awareness program

A major focus of Airport AFV fleet deployment and operations will be on expanding procurement of AFVs, as detailed in the Fleets section of this document. However, the Airport also realizes that indirect policies and support of the AFV Program will also be necessary. This indirect support will include increasing staff awareness of the Clean

Fuel Plan, the AFV Program, and the many benefits of AFV use by the Airport. By expanding staff awareness and understanding of AFVs, be even those staff not directly in contact with the AFV fleet, the AFV Program will be more fully integrated into the PHL culture and thus better positioned for success. The Airport will develop an internal AFV education and awareness program to facilitate this indirect, but important, support for the AFV Program. These activities may include AFV seminars, AFV displays and ride-and-drives, communiqué in PHL newsletters and internal communications, and periodic updates on the AFV Program.

## **B. Tenant and Related Airport Fleets**

The Airport has already committed to one of the essential tasks necessary in supporting AFV deployment in tenant fleets – development of a new public CNG station. This station will allow the Airport to incentivize and promote AFV use to Airport tenants and related fleets. To further support tenant use of AFVs, the Airport will develop policies that provide economic and political advantages to fleets deploying AFVs (as well as disincentives for nonuse). By increasing the capability for and the attractiveness of AFV use, the Airport will use positive reinforcement mechanisms to develop tenant AFV use, rather than mandates, whenever possible. As with the policies developed to support internal Airport use of AFVS, the Airport will develop policies and mechanisms that promote AFV use and indirectly support a pro-AFV culture at the Airport. Some of these policies will focus on economic incentives, which will positively affect the tenant's bottom line while operating AFVs, while others will provide political and public reinforcement for AFV deployment. The following tenant fleet policy initiatives will be reviewed for inclusion in the Airports' AFV Program.

- Solicit participation of all airport tenants in AFV Working Group
- Provide tenants with an overview of Airport AFV Program and AFV technologies
- Develop variable permit fee structure for tenants that reduces fees for AFVs
- Develop variable access fee system for all commercial vehicles that provides reduced fees for AFVs on a per-trip or annual basis
- Encourage tenants to purchase AFVs during regular fleet replacement
- Publicize tenant AFV achievements throughout airport and community
- Offer AFV tenant training in coordination with PHL training courses
- Review possible modifications to tenant lease agreements to require all tenants to deploy AFVs (as percentage of fleet size or new vehicle purchases)
- Install sufficient power and charging equipment for electric AFVs during major terminal upgrades
- Determine value of DEP emission reduction offsets and develop financial incentive program to encourage/assist tenants to switch to AFVs
- Develop promotion plan to highlight tenant AFV activities
- Investigate and review consolidation potential of rental car agency shuttles and assist in development of consolidation plan that includes AFV use requirements
- Investigate and review consolidation potential of hotel shuttles and assist in development of consolidation plan that includes AFV use requirements

## C. Regional Fleets and General Outreach

As the Airport expands its AFV Program it will be well positioned to advance public understanding and use of AFVs throughout the Philadelphia region. Promoting the successes of the Airport's AFV Program will not only demonstrate the Airport's leadership in AFV and environmental initiatives, it will provide an example of how other regional fleets can successfully make the switch to alternative fuels. The development of the new public access CNG station will provide a new fueling capability for the region's natural gas vehicle fleets and will help advance public understanding of the benefits of AFV use. The Airport will investigate potential economic incentives to support increased public use of AFVs, but will focus most general public outreach activities on increasing general AFV understanding and awareness of the Airport's AFV Program.

A key element of the Program will be to communicate the existence, accomplishments and benefits of the Airport's AFV Program. The Airport will make every effort to publicize these activities to promote greater Program involvement and demonstrate the Airport's concern for the community. One method of promoting the AFV Program will be to include articles about the Program and its successes in the recently initiated "Environmental Stewardship" publication. This brochure has been specifically designed to promote and expand awareness for the Airports environmental activities and covers issues ranging from wetlands and endangered species to noise and water quality. The AFV Program will regularly submit articles for publication in Environmental Stewardship, leveraging existing Airport marketing mechanisms.

The Airport will also develop new mechanisms for expanding awareness of and involvement in the AFV Program. This will include such activities as working with the GPCCP to hold "Advancing the Choice" and AFV Program kick-off events, as appropriate, and developing marketing packages promoting the Airport's AFV activities, benefits and partners. These marketing packages may be brochures produced for in-airport displays, submissions to local media, vehicle decals for AFVs, or any other relevant method to broaden the awareness and interest in the Airport's AFV Program.

The following policy initiatives will be reviewed for inclusion in the Airport's AFV Program.

- Develop a general outreach plan
- Develop AFV Program promotional brochures for key airport locations
- Create a Public Announcement or advertising plan for major AFV developments
- Conduct public AFV events to increase awareness for the Airport's AFV Program
- Provide preferential parking or variable parking rates for AFV users
- Develop "Advancing the Choice" events at the Airport, with the GPCCP
- Develop a Clean Fuel Plan "Kickoff" event and outreach program
- Develop AFV/Clean Fuel Plan decals for all Airport AFVs

## D. Outcomes and Implementation Schedules

The Airport will initiate the expansion of the current AFV Program by officially adopting this Clean Fuel Plan. This will memorialize this Plan and authenticate the tasks and activities outlined within the Plan, as well as provide the necessary executive level support and backing for its successful implementation. The Airport AFV Champion will then establish the AFV Working Group and schedule and begin implementing the critical Clean Fuel Plan elements. Some of the critical action items for policy development and outreach activities are provided below. The proposed action items include a general schedule for implementation and the persons or departments responsible for overseeing each task.

### Action Items for Policy Development and Outreach Activities

- Officially adopt the Clean Fuel Plan  
*Deliverable Date – Feb 2004 / Charge – PHL Executive*
- Establish the AFV Working Group and Schedule  
*Deliverable Date –Feb-Mar 2004 / Charge – AFV Champion Calvin Davenger*
- Develop an internal PHL AFV education and awareness plan  
*Deliverable Date – May-Jul 2004 / Charge – AFV Champion Calvin Davenger*
- Develop a general outreach plan  
*Deliverable Date – May-Jul 2004 / Charge – AFV Champion Calvin Davenger*
- Establish pro-AFV policies for PHL fleets  
*Deliverable Date – Jun-Aug 2004 / Charge – AFV Champion Calvin Davenger*
- Investigate AFV policies for tenant fleets  
*Deliverable Date – Jun-Aug 2004 / Charge – AFV Champion Calvin Davenger*

## VII. FUNDING AND BUDGETS

To support the long-term success of the AFV Program, the Airport must include funding in the annual budgets for vehicle procurement, station development, and ongoing maintenance and training associated with AFV use and the AFV Program. Therefore, proper budgetary planning will allow the Airport to anticipate and prepare for all AFV related cost impacts, as done with all other activities at the Airport. The finance department, working closely with the Airport Champion and AFV Working Group, will investigate the potential budgetary planning impacts and update the Airports budgets and processes accordingly.

To allow for greater cost effective deployment of AFVs, the Airport will also pursue funding assistance wherever possible. The Airport will work with Clean Cities and other partners to pursue funding from funding programs, when available. The Airport will also investigate other potential programs and sources for funding opportunities as they appear, such as preparing for the pending FAA reauthorization bill and its potential to fund AFV procurement at the Airport.

### A. Alternative Fuels Incentive Grant

The Alternative Fuels Incentive Grant (AFIG) program, offered through the Greater Philadelphia Clean Cities and Pennsylvania Department of Environmental Protection, was designed to reduce the incremental cost of light duty alternative fuel vehicles for the purpose of increasing AFV use in the State. The program will fund a portion of the incremental cost of an AFV as compared to a conventionally fueled vehicle. Currently the grant will cover up to 20% of this incremental cost and can be applied to new OEM vehicle purchases or the costs of eligible conversion components and installation. Requirements include providing proof of purchase, meeting general reporting requirements and joining the GPCCP. The Airport should immediately begin pursuit of these funds, as they may not be available for much longer, by working with the GPCCP to secure these grant funds. AFIG funds can be used in tandem with other funding incentives. Application instructions for AFIG are included in the Appendix of this document.

### B. Congestion Mitigation and Air Quality Program

The Congestion Mitigation and Air Quality program (CMAQ) provides federal funds for transportation projects that improve air quality and reduce traffic congestion in areas classified as air quality nonattainment areas. CMAQ was created by the 1991 Intermodal Surface Transportation Efficiency Act and is available to state and local government agencies. Projects are solicited in odd numbered years with applications due in April. Alternative fuel vehicles and supporting infrastructure projects are eligible for CMAQ funds and applicants must provide at least a 20% match.

The GPCCP and Delaware Valley Regional Planning Commission have CMAQ funds available to assist with up to 72% of the incremental cost of AFVs. These funds can be used for light, medium and heavy-duty AFV purchases and are available to both public and private entities. This program has similar requirements to the AFIG funds and

funds from AFIG can be used as part of the 28% match requirement. Application instructions and guidelines can be found at the following website.

[www.fhwa.dot.gov/environment/cmaqpgs/index.htm](http://www.fhwa.dot.gov/environment/cmaqpgs/index.htm)

### **C. State Energy Program – Special Projects Solicitation**

The US Department of Energy provides funds on a competitive basis for states to design and carry out their own energy efficiency and renewable energy programs through the State Energy Program (SEP). Designated Clean Cities coalitions are eligible for this funding for the deployment of AFVs and development of supporting infrastructure. Preferred projects are those that acquire commercially available AFVs and maximize alternative fuel use in niche markets. Airports are specifically identified as one of these niche market applications. The SEP solicitations are released annually in the late winter/early spring.

The Airport will work with the GPCCP to develop and submit a proposal for the next SEP solicitation. The Clean Cities coalition has had success with this program in the past and any future SEP proposal should compliment both the PHL AFV Program and any other funding assistance activities.

### **D. Broad Area Announcements**

The DOE's Office of Energy Efficiency and Renewable Energy offers financial assistance through Broad Area Announcements (BAA) for information dissemination, public outreach, training and technical analysis, and technical assistance activities related to renewable energy and energy efficiency. BAA projects involve increasing the understanding and awareness of energy efficiency and renewable or alternative energy uses and technologies; stimulating increased energy efficiency in transportation, buildings, industry, and the federal sector; and encouraging increased use of renewable and alternative energy. Announcements about available funding are made each fall; proposals are due in February.

<http://doe-iips.pr.doe.gov/>

### **E. Vision 100 – Century of Flight Authorization Act of 2003**

Recently Congress passed and the President signed Vision 100 (Public Law 108-176), which will have a major impact on the use of AFVs at airports across the country. Vision 100 is the comprehensive reauthorization bill that sets the FAA's spending limits and for the first time includes measures to fund AFVs and supporting infrastructure as an integrated part of the regular FAA budget. Final rulemaking will further define the impact this will have on AFV use, but the current language includes the following:

- Funding for incremental costs of AFVs
- Funding for alternative fuel station development
- EPA emission credits for emission reductions achieved through AFV deployment

The inclusion of AFV language and funding in Vision 100 comes from the success of the FAA's pilot Inherently Low Emission Airport Vehicles (ILEAV) program that authorized the FAA to fund AFVs up to \$2 million per airport at 10 airports nationally – something never before done by the FAA. The ILEAV Program was considered so successful that its concepts were extended into the new reauthorization. It is expected that up to \$300 million will be available to airports for AFVs and supporting infrastructure. This funding will be offered on a competitive basis and will be part of the Noise and Air Quality sections of the reauthorization. The agreement by the EPA to ensure emission credit for voluntary AFV emission reduction measures, without “lowering the bar”, was critical to all parties accepting the proposed language.

The Airport should continue to track developments of Vision 100 and be prepared to submit funding requests for PHL's Clean Fuel Project. The Airport should use the fleet deployment plan in this document to develop funding requests, when appropriate.

## F. Outcomes and Implementation Schedule

To take advantage of potential funding assistance programs the Airport must develop a general funding proposal package – based on this AFV deployment plan – that describes the Airport, its AFV Program, and various AFV procurement details (fleet targets, vehicle types, estimated emission reductions, etc). This will allow the Airport to develop a cohesive approach to identifying funding assistance programs and developing tailored funding proposals. With a funding assistance plan that has identified potential funding programs the Airport will be more likely to develop customized funding proposals quickly that have high probabilities for success. To maximize the potential for funding assistance, the Airport must develop a funding plan early, to capitalize on all opportunities and reduce total Program costs.

Below is a list of action items for securing funding assistance. The proposed action items include a schedule and the persons or departments responsible for overseeing each task.

### Action Items for Funding and Budgetary Items

- Develop Prioritized List of Potential Funding Options w/ Deadline Calendar  
*Deliverable Date – Feb 2004 / Charge – AFV Champion & Working Group*
- Develop General Funding Proposal Package (Boilerplate Text & Key Aspects)  
*Deliverable Date – Mar 2004 / Charge – AFV Champion & Working Group*
- Develop and Submit SEP Proposal  
*Deliverable Date – May 2004\* / Charge – AFV Champion & Working Group*
- Develop and Submit CMAQ Proposal  
*Deliverable Date – Apr 2005\* / Charge – AFV Champion & Working Group*
- Develop and Submit AFIG Proposal  
*Deliverable Date – Aug 2004\* / Charge – AFV Champion & Working Group*

*\*anticipated*

## VIII. EMISSION REDUCTION BENEFITS AND OFFSETS

A critical factor to the success of the voluntary AFV Program is based on the assumption that PHL can retain the benefit of voluntary AFV emission reductions that can then be made available, if needed, during future development and/or expansion efforts without “lowering the bar.” Otherwise any voluntary reductions in the Airport’s emission baselines may make it more difficult to reach potential future reduction needs, negating the benefit of early, voluntary program initiation. This requires the Airport to work closely with the Pennsylvania DEP (and the City of Philadelphia), who is the regulating authority for air quality issues regarding airport development.

This issue of not providing disincentives for airports who wish to initiate early voluntary emission reduction measures is not unique to Philadelphia; it is an issue that has been present nationally for many years. However, several activities are working to address this issue at both local and national levels. Several airports have developed local agreements with their air quality regulators that allow the airport to initiate early emission reduction measures and not have this negatively impact their future situation.

In Washington, the Seattle-Tacoma International Airport worked with the Puget Sound Clean Air Agency, their local air regulatory agency, to establish a memorandum of understanding (MOA) that allows the airport to establish and use emission reduction credits created through its deployment of CNG vehicles. In this program, the airport is able to “bank” any surplus emission reductions, which can be used for future emission reduction needs of up to ten years. These emission reduction credits are only available for the airport’s use and cannot be sold or traded to other entities. In Wisconsin, Milwaukee’s General Mitchell International Airport has the ability to register its emission reduction measures created from its AFV deployment activities with the Wisconsin Department of Natural Resources, a program designed to incentivize early voluntary deployment of AFVs. Both of these examples show how airports and air quality regulators can work together to develop mechanisms that are mutually beneficial to both parties, and the general public. Details on these local agreements are presented in the Appendix.

Nationally the FAA and EPA, who recently released a precedent-setting joint letter, are discussing this issue as well. This joint FAA/EPA letter, presented in the Appendix, addresses the concern that airports participating in the pilot FAA Inherently Low Emission Vehicle Program (ILEAV) may not receive emission credit from the EPA for AFV deployments through this program. The ILEAV pilot program was the first foray by the FAA into funding AFVs, as well as the first partnership between the EPA and FAA to officially investigate and deploy AFVs at airports. Thus far the ILEAV program has been considered a success and continues to deploy AFVs at the ten selected airports. The EPA/FAA letter recognizes the national need to provide all parties with assurances that their efforts will be rewarded, not penalized, and represents a national effort to resolve this issue.

The FAA and EPA are currently taking the lessons learned from ILEAV, including the need to recognize emission reduction efforts, and including explicit options for AFV funding in the recently signed new FAA reauthorization bill (Vision 100). The new reauthorization not only allows AIP and PFC funds to be used to help pay for AFVs and

supporting infrastructure, it will also integrate AFV use into the standard funding mechanisms and daily operations of airports nationally.

Initial discussions between the Airport and the DEP have already taken place, agreeing in principal on developing mechanisms to ensure and secure the air quality benefits of the Airport's AFV Program. While additional discussions are needed to refine the details of such a program/agreement, all parties recognize the strong positive benefits that an AFV Program at the Airport can provide. The local and national "emission credit" examples will be useful in providing guidance during these discussions and program development.

Below is a list of action items for securing recognition of voluntary emission reduction activities. The proposed action items include a schedule and the persons or departments responsible for overseeing each task.

#### **Action Items for Emission Reduction Recognition**

- Review other airport AFV Programs and emission reduction agreements  
*Deliverable Date – Feb 2004 / Charge – AFV Working Group*
- Coordinate AFV Program activities with Master Planning and EIS activities  
*Deliverable Date – Feb 2004 / Charge – AFV Champion*
- Track the FAA reauthorization (AIR 21) for emission reduction guidance  
*Deliverable Date – Mar 2004 / Charge – AFV Working Group*
- Work with the DEP to secure recognition of Airport emission reduction activities
  - Develop schedule for exploratory discussions
  - Determine critical issues and needs
  - Determine DEP and PHL goals and objectives
  - Develop plan for satisfying above goals and needs*Deliverable Date – Mar 2004 / Charge – AFV Champion & Working Group*

## **APPENDICES**

Appendix A – Medium and Heavy Duty CNG Engines

Appendix B – Regional Hotel Locations and Possible Consolidation Routes

Appendix C – AFIG Grant Application

Appendix D – FAA / EPA Joint Letter on Emission Reduction Credits

Appendix E – Examples of Local Emission Reduction Credit Agreements and Memorandums of Understanding

**APPENDIX A:**  
**Medium and Heavy Duty CNG Engines**

### Medium- and Heavy-Duty CNG Engines

Manufacturer	Model	Fuel Type	Fuel Configuration	Displacement (liters)	Rated HP	Peak Torque (ft.-lb)
Alternative Fuel Technology <sup>1</sup> (Navistar)	DT466	C/LNG	Dedicated	7.6	250	640
Baytech Corp. (GM)	N/A	CNG	Dedicated	4.3	117/118/122	182/184/188
	L31	CNG	Dedicated	5.7		
Clean Air Partners (Caterpillar)	3126	C/LNG	Dual-Fuel	7.2	190/250	520/640
	C-10	C/LNG	Dual-Fuel	10	305	1050
	C-12	C/LNG	Dual-Fuel	12	360/410	1250
Cummins-Westport <sup>2</sup>	B5.9	C/LNG	Dedicated	5.9	150/195/230	375/420/500
	C8.3	C/LNG	Dedicated	8.3	250/275/280	660/750/850
	ISX <sup>3</sup>	C/LNG	Dedicated	8.9	320-500	1450
Detroit Diesel	50G	C/LNG	Dedicated	8.5	275	890
	60G	C/LNG	Dedicated	12	330/400	1400/1450
Ford	5.4L	CNG	Dedicated	5.4	225	325
John Deere	6068H <sup>4</sup>	CNG	Dedicated	6.8	225	640
	6081H	CNG	Dedicated	8.1	250/280	800/900
Mack <sup>5</sup>	E7G	C/LNG	Dedicated	12	325/350/425	1180/1250/1440
Technocarb (GM) <sup>6</sup>	-	C/LNG	Ded or Dual	8.1	280	395

OEM as listed, or Converter (OEM)

1 – A natural gas version of the Caterpillar C12 engine is expected soon.

2 – Currently working on 9L, 11L and 15L natural gas engines.

3 – Available in 2004

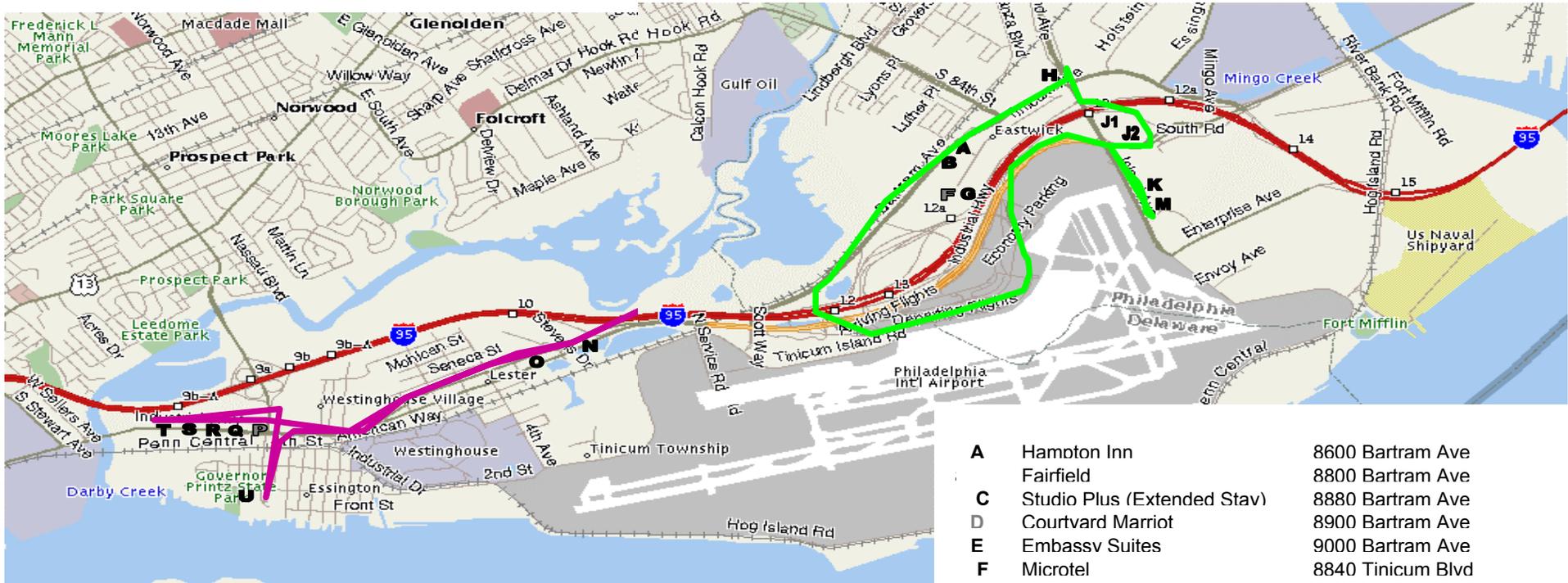
4 – The 6.8L engine production facility has relocated and is currently in temporary hiatus, however engines are still available.

5 – Highway tractor model is in development.

6 – Certified for natural gas and propane as dedicated or dual fuel. Certification work currently underway on GM 5.3L and 6.0L.

**APPENDIX B:**  
**Regional Hotel Locations  
and Possible Consolidation Routes**

### Regional Hotel Locations and Possible Consolidation Routes



#### Potential Hotel Shuttle Routes

Hotels A-M Loop – 7 miles r/t    9 hotels  
 Hotels N-U Loop – 10 miles r/t    8 hotels  
 Number of stops will affect total en route times

<b>A</b>	Hamton Inn	8600 Bartram Ave
	Fairfield	8800 Bartram Ave
<b>C</b>	Studio Plus (Extended Stav)	8880 Bartram Ave
<b>D</b>	Courtvard Marriot	8900 Bartram Ave
<b>E</b>	Embassv Suites	9000 Bartram Ave
<b>F</b>	Microtel	8840 Tincum Blvd
<b>G</b>	Extended Stav	9000 Tincum Blvd
<b>H</b>	Marriot	1 Arrivals Rd
<b>J1</b>	Sheraton Four Points	4101 A Island Ave
<b>J2</b>	Sheraton Suites	4101 B Island Ave
<b>K</b>	Hilton	4509 Island Ave
<b>M</b>	Residence	4630 Island Ave
<b>N</b>	Renaissance	500 Stevens Dr
<b>O</b>	Econolodae	600 S. Governor Printz
<b>P</b>	Motel 6	43 Industrial Hwv
<b>Q</b>	Holidav Inn	45 Industrial Hwv
<b>R</b>	Red Roof Inn	49 Industrial Hwv
<b>S</b>	Comfort Inn	53 Industrial Hwv
<b>T</b>	Ramada Inn	76 Industrial Hwv
<b>U</b>	Lagoon	101 Tavlur
	Tropiano (service)	Various hotels

**APPENDIX C:  
AFIG Grant Application**

# Alternative Fuels Incentive Grant Program



## Application Instructions



Commonwealth of Pennsylvania

Department of Environmental Protection

[www.dep.state.pa.us](http://www.dep.state.pa.us)

Edward G. Rendell  
Governor

Kathleen A. McGinty  
Secretary



## APPLICATION INSTRUCTIONS

The following describes the information required to complete the application. The application form must be typed or printed neatly and all parts completed.

### I. GENERAL INFORMATION (Pages 1 and 2)

1. Complete a, b, c and d. Legal name of applicant or name of primary organization or company which will own, operate all equipment purchased with the requested Incentive Grant funds. Address of applicant and project location (if different from applicant's), the name, telephone and fax number of person to contact on matters pertaining to this application.
2. Enter date application was prepared.
3. Enter applicant's federal employer identification number assigned for IRS purposes. Private individuals, enter social security number.
4. Briefly summarize the project in the space provided. Include total number of vehicles, fuel choice, general description (size, location, etc.) of refueling/recharging facility. Provide a brief summary of innovative energy technology project. Provide specific details on page 3 under PROJECT DESCRIPTION.
5. Enter approximate date the project is expected to begin (usually associated with the date of grant award) and an end date. Applicant should allow up to 6 months for application review and grant execution.
6. Enter dollar amount provided from all funding sources. Up to 20 percent of eligible project costs are available from DEP for this funding cycle.
7. Enter letter in block to identify category of applicant.
8. For refueling or recharging facilities, list the county of location. For vehicles, list the county(s) in which the vehicle is expected to operate on alternative fuel for a minimum of 50 percent of the time. For vehicles that operate in more than one county, estimate the percentage of the annual alternative fueled mileage for each county affected.
9. The authorized representative signing this section must be authorized by a board of directors, governing entity, etc. as the legal signatory for the applicant and the person capable of entering into a contract with the Commonwealth. The original signature must be dated.
10. Please complete.
11. Please complete.

12. Please complete

13. Please complete.

## II. PROJECT DESCRIPTION

Pages 3 through 5. Provide detailed responses to A, B, C, D, E and F. Attach additional sheets if necessary. If applying for funds for an Innovative Energy Technology grant, complete pages 3 through 5, applicable sections of pages 6 through 9 for equipment purchases, and then move on to page 14.

Pages 6 through 9. Complete all applicable sections. Instructions for each section are provided below.

- 1. Vehicle Information** - List all vehicles to be converted, repowered or purchased. Information on the make, model, engine size, year, mileage and alternative fuel choice, must be completed. Specify whether vehicle is dedicated, dual-fuel, bi-fuel, hybrid or electric.
- 2. Training** - Provide a brief description of the plans to train alternative fuel vehicle operators and maintenance staff in areas of vehicle operation, refueling or recharging, location and function of fuel system components and safety measures.
- 3. Conversion/Repowering Information** - If vehicle is converted/repowered, provide name of company performing the remanufacturing and details of fuel system equipment manufacturers. Include the company names, a contact person and telephone number of suppliers and manufacturers providing the estimates. Provide the appropriate information regarding labor costs.
- 4. Refueling and Recharging Information** - Specify whether the station is public, semi-public or private. Include the company names, a contact person and a telephone number of equipment suppliers and manufacturers providing the estimates. Provide the appropriate information regarding labor costs.

## III. BUDGET INFORMATION (Pages 10, 11, 12 and 13)

Show total estimated cost for all applicable line items identified on the BUDGET FORM. Instructions for completion of each line item are listed below. A description of the eligible costs is in the Guidelines and General Information, Part F, of this application package. Total cost for equipment, installation labor, site preparation labor and other related costs must be shown separately. If freight charges are estimated separately, explain and list under 1.E. "Other" on page 10. For this funding cycle, the applicant may request up to 20 percent of the eligible costs of alternative fuel systems, refueling or recharging facilities and the incremental cost for the purchase of a new OEM vehicle.

**Note: AFIG funds cannot be used to cover costs associated with preparation of the AFIG application, land acquisition, permits, landscaping, advertising, business start-up costs, indirect costs (i.e. overhead, contingency funds, etc.) personnel costs, travel, subsistence, conference or meeting expenses including catering, equipment and room rental, training and other costs not related to vehicle purchases, equipment purchases and installation of alternative fuel systems. For Innovative Energy Technology projects, personnel costs of the researchers is eligible.**

AFIG funds can be used for engineering consultation under the following conditions: a) the services are contractual; b) the services are for equipment sizing and site plans; and, c) the name, address and telephone number of the consultant is provided in the application. **DEP will limit reimbursement for consultant costs up to a maximum of 5 percent of the “total” eligible project cost -- the sum of the equipment costs and the cost to install the equipment; do not include the consultant costs listed in the “other” category under 2.J. on III. BUDGET FORM, Page 10.**

Obtain at least two estimates from equipment manufacturers, vendors, installers, vehicle manufacturers or dealers or other sources. If an applicant is an equipment vendor, three estimates must be provided with the application. **The cost estimates must be used by the applicant to determine the requested grant amount.** Estimates may be obtained by telephone but must be submitted in written form on Pages 7, 8 and 9. Estimates must show cost per AFV system and per cylinder (includes sizes, number per vehicle). List separately all major component prices (e.g. compressor, cylinders, dryer, pumps, storage tanks, dispensers, etc.) for a refueling or recharging facility. All labor costs associated with installation of a facility must be shown as a separate cost from the equipment and associated with a specific task.

**Note: DEP will make payment to the successful grant recipient based on review of invoices. DEP will not fund costs deemed unreasonable or costs in excess of the requested grant amount.**

Page 10 - Budget Form (Vehicle Purchase or Conversion, Refueling or Recharging Facilities). Applicants requesting funds for vehicle purchase or conversions, refueling or recharging stations must complete this form. Divide the cost for each category to show the cost-share portion from each funding source. The budget narrative on pages 11, 12 and 13 must provide a detailed breakdown of the costs shown on the budget form. A discussion of each category follows.

**Note:** All applicants must complete the budget narrative. References to attachments of cost estimates only will not be accepted.

1. Equipment. Show total cost for all equipment to be purchased for the conversion of vehicles and the installation of refueling or recharging facilities in categories A - I of the budget form. The incremental cost of a new AFV must be shown in 3. You must complete the budget narrative on pages 11, 12 and 13. All major equipment and labor

costs must be listed separately with the corresponding cost to verify the total cost shown on the budget form.

- A. Conversion systems. List all major components (excluding cylinders) to be installed in vehicles.
  - B./C. Cylinders. List all on-board storage cylinders to be installed in the vehicles and the cost for each size. List station storage cylinders separately here.
  - D. Refueling or recharging unit. List all equipment to be purchased to construct a refueling or recharging facility (excluding cylinders), to install fuel storage tanks, dispensing equipment and equipment to upgrade existing units. Itemize the cost of each major piece of equipment.
  - E. Other. List and explain costs to applicant not identified on this form, i.e., materials and miscellaneous equipment and supplies used in vehicle conversion and/or site preparation. Freight charges should be shown here if provided separately on estimates.
2. Labor. Show *total labor cost* for each cost category on the budget form. An explanation of all labor costs shown on the budget form must be provided in the budget narrative. Show the hourly rate and total labor hours required to complete each of the tasks listed below on the budget narrative.
- F. Vehicle conversion. Show hourly rate, total hours and total cost to convert or repower a vehicle.
  - G. Refueling or recharging facility installation. Show by specific task the total labor hours, hourly rate and total labor cost to complete installation.
  - H. Site preparation – Refueling/Recharging Facilities *only*. Show by specific task the total labor hours, hourly rate and total cost to prepare a site for installation of the refueling or recharging unit. Provide a *detailed narrative description* of all work to be completed at the site.
  - I. Equipment Installation. Show by specific task, the total labor hours, hourly rate and total cost for any equipment installation for refueling/recharging facilities *only*.
  - J. Other. Itemize the costs and provide an explanation. Explain all costs in budget narrative that are shown on the budget form.

**Note: The Pennsylvania Prevailing Wage Act, 43 P.S. Sections 165-1 et seq., and the regulations promulgated thereunder, 43 Pa. Code Chapter 9, Subchapter E may**

apply to construction projects with a cost in excess of \$25,000. For information, contact the Department of Labor and Industry, Labor and Industry Building, Harrisburg, PA 17120, or telephone 1 (800)932-0665. Allow adequate time to complete the required forms. It is the responsibility of a grant recipient to ensure the Act is followed if applicable.

3. AFV Incremental Cost. Enter the incremental cost of the AFV to be purchased. Applicants requesting a grant to purchase or lease a new OEM vehicle must obtain the actual price of the alternative fuel vehicle and the price of the same or similar make and model year conventionally fueled vehicle. The incremental cost is the difference between the purchase price of the AFV and the conventional vehicle.

Page 14 - Budget Form Innovative Energy Technology (IET). Only applicants requesting funds for an Innovative Energy Technology (IET) project must complete this form. Show the total cost in category A - K on the IET budget form. The cost for each category must be divided to show the cost-share portion for each funding source. The budget narrative on pages 15, 16 and 17 must provide a detailed breakdown of each cost category on the budget form. Instructions for each line item are listed below. Attach additional sheets if needed.

- A. Personnel. Identify by specific task the total hours and hourly rate of all people conducting tasks for this project.
- B. Contractual. List total cost of consultants and subcontractors participating in the development and evaluation of the project. Describe in detail the tasks to be performed, the total hours and the hourly rate to be charged to the project.
- C. Equipment. List all major equipment components to be purchased and the unit cost required to complete the project.
- D. Field Testing. Describe in detail each task and the unit cost for field testing and evaluation.
- E. Other Testing. Describe in detail all other pertinent testing of the technology including emissions testing, safety testing or durability. Specify type of testing and show the unit cost.
- F. Incremental Cost/IET Vehicle. For vehicle projects incorporating an innovative energy technology, describe the methodology for determination of the incremental cost as defined in the Guidelines and General Information, Part I. Definitions. Determine this cost by comparing the developmental cost of the IET vehicle with the purchase price of a comparable conventional fuel vehicle. Provide the list price of the comparable vehicle from the vehicle manufacturer.

- G. Supplies. Office materials, computer supplies, other services **required to perform project tasks**.
- H. Freight Charges. Costs to deliver required equipment to complete the project. Describe the charges and show the unit cost.
- I. Construction Labor. Costs to install equipment incorporating the innovative energy technology, to install refueling or recharging facilities. Show by specific task, the total labor hours, the hourly rate and the total costs to perform the required tasks.
- J. Site Preparation Labor. Describe in detail any labor costs associated with site preparation. Identify the total hours, hourly rate and the total cost.
- K. Other Labor. Describe in detail any labor costs associated with the project not listed above. Identify the total hours, hourly rate and the total cost.

#### IV. ASSURANCES

Page 18. This part contains the assurances required by the applicant for participation in the Alternative Fuels Incentive Grant program. The Assurances are referenced by regulation section in the *Guidelines & General Information*. The authorized representative's original signature is required on page 18.

This document and related environmental information are available electronically via Internet. For more information, visit us through PA PowerPort at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (directLINK "Alternative Fuels").



[www.GreenWorks.tv](http://www.GreenWorks.tv) - A web space dedicated to helping you learn how to protect and improve the environment. The site features the largest collection of environmental videos available on the Internet and is produced by the nonprofit

**APPENDIX D:**  
**FAA / EPA Joint Letter on Emission Reduction Credits**



Federal Aviation Administration  
Department of Transportation



Environmental Protection Agency

AUG 15 2003

Ms. Nancy N. Young  
Assistant General Counsel and Managing  
Director of External Affairs  
Air Transport Association of America  
1301 Pennsylvania Ave., NW  
Suite 1100  
Washington D.C. 20004

Dear Ms. Young:

We are contacting you about the effort to develop a national agreement for airport emissions reductions through the EPA/FAA Stakeholders Process, in which the Air Transport Association (ATA) and several member airlines are active participants. We believe that the Stakeholders' efforts have the potential to lead to important air quality benefits through effective voluntary programs, including an agreement to replace or retrofit existing airport ground support equipment (GSE) with lower emission GSE.

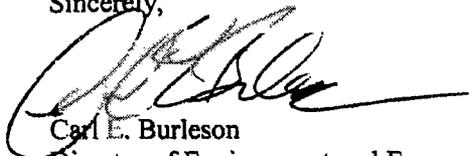
During our discussions on a GSE emissions reduction program, we were made aware that some airlines have concerns about the relationship between such a program and the Federal Aviation Administration (FAA) Inherently Low Emission Airport Vehicle (ILEAV) Pilot Program. The 10-airport ILEAV Program began in 2001 and is directed at GSE alternative fuel conversions. Several airlines participating in ILEAV have asked whether they will receive "credit" for emission reductions from a GSE program in the Stakeholders national agreement. On behalf of the Environmental Protection Agency (EPA) and the FAA, we want to assure ATA members that airline investments in ILEAV will be recognized in the Stakeholders Process and that their actual emission savings through ILEAV will be counted in meeting the future national goal that is currently being negotiated for GSE emission reductions. This position has been endorsed by the other participants in the Stakeholders process and will be included in any negotiated agreement.

It makes sense to encourage good investments in cleaner technology sooner rather than later. The airlines are contributing millions of dollars as part of the \$40 million ILEAV

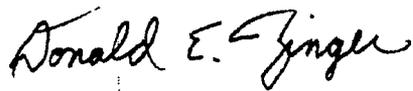
program, of which only \$17 million dollars is Federal grant assistance. The airlines are involved in eight pilot projects in Atlanta (ATL), Chicago (ORD), Dallas-Ft. Worth (DFW), Denver (DEN), New York Kennedy (JFK) and LaGuardia (LGA), Sacramento (SMF), and San Francisco (SFO). Of the 1,500 vehicles planned in ILEAV, the FAA reports that 125 project vehicles are in operation with another 150 to be in place this year. The total lifetime emissions benefits could be as high as 7,000 tons of nitrogen oxides (NOx) and 200,000 tons of carbon monoxide (CO).

During this uncertain financial time, we appreciate the continuing efforts of the airlines to invest in new low emission technology for the environment. We hope that this letter of assurance will alleviate concerns about the relationship between the ILEAV Program and a prospective national agreement on GSE.

Sincerely,



Carl E. Burleson  
Director of Environment and Energy  
Federal Aviation Administration



Donald E. Zinger  
Assistant Director  
Office of Transportation and Air Quality  
Environmental Protection Agency

cc: Randy Harrison, Delta Airlines  
David Korn, American Airlines  
Dan Tisoncik, United Airlines

## **APPENDIX E:**

### **Examples of Local Emission Reduction Credit Agreements and Memorandums of Understanding**

## MEMORANDUM OF AGREEMENT – NORTH CAROLINA

This Memorandum of Agreement (Agreement) is made between **The Raleigh-Durham Airport Authority** (the Authority) and the **North Carolina Division of Air Quality** (NC DAQ).

### Recitals

#### Purpose

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The purpose of this Agreement is to provide incentives for voluntary air pollution emission reductions by creating emission reduction credits (ERCs). ERCs recognize voluntary emission reductions, and are credits that can be banked for future use to offset emission reduction requirements. ERCs quantify and document voluntary emission reduction calculations, and may be used in the event that NC DAQ mandates “across the board” or targeted emission reductions from regional or statewide entities. In establishing ERCs, NC DAQ acknowledges that it will seek comparable reductions from other sources before requiring further reductions from voluntary early reduction participants.

The Authority and NC DAQ recognize that there are opportunities to improve air quality, to mitigate current air quality problems, or to avoid future air quality degradation, aside from those mandated by State and Federal law. However, there are no significant incentives to encourage early action to take advantage of these opportunities. In fact, the Authority currently has a disincentive for early action when considering future mandates for which it may be held accountable. The surest way to achieve any future mandated reductions would be to delay taking any voluntary early emission reduction measures. ERCs issued by the NC DAQ for voluntary emissions reductions achieved in the near term provide a way to overcome this regulatory barrier, allowing for more immediate and continued air quality benefits.

This Agreement is the framework for creating a voluntary, quantifiable ERC banking system between the Authority and NC DAQ. The system will include:

- a. Criteria for actions, projects, and programs to qualify for ERCs;
  - b. A mechanism for tracking and reconciling ERCs;
  - c. A process for ensuring that both parties agree on the size of the banked credits;
- and
- d. A system for “using” credits.

#### The Authority

---

The Authority operates the Raleigh-Durham International Airport. As the Authority fulfills its day-to-day operating responsibilities, it may identify voluntary opportunities to achieve emissions reductions through, for example, procurement and operation of cleaner burning equipment, refinement of programs, improvement of access roadways, reduction of aircraft or vehicle queuing times, and other means. Although such opportunities to reduce emissions would likely increase the Authority’s anticipated capital expenditures,

the Authority wishes to consider them, provided there are incentives to make voluntary reductions.

Further, through this Agreement, the Authority agrees to participate in a pilot program to develop an enforceable process for banking ERCs to make voluntary reductions more feasible. If the program is successful, the Authority and NC DAQ anticipate subsequent regional application of this process.

### **The NC DAQ**

---

The NC DAQ is responsible for keeping the air clean in the State of North Carolina, including Wake and Durham Counties. The NC DAQ seeks to deal with air quality in the most effective ways possible. This means that, in addition to fulfilling the traditional regulatory role, the NC DAQ will seek out effective methods to develop and promote incentives that enable local governments, individuals, and businesses to make clean air choices. Accordingly, the NC DAQ encourages voluntary reductions by the Authority.

#### **Agreement**

The Authority and the NC DAQ (the Parties) agree that projects, processes, alternative equipment selection, etc. that reduce criteria pollutant emissions on a voluntary basis and qualify for ERC issuance have local, and regional, air quality benefits. NC DAQ supports the Authority's effort to identify such projects, processes, and alternative equipment selection. Additionally, they recognize that the Authority's ability to implement changes designed to reduce emissions on a voluntary basis is, in part, contingent on establishing a process to allow the Authority to obtain, and use at a later date, quantified emission reduction credits.

The Parties, therefore, agree to establish a process for the Authority to document voluntary emissions reductions and bank and redeem ERCs in the event that NC DAQ mandates future emission reductions. The process will require that emissions reductions are surplus, quantifiable, permanent, and consistent with EPA guidance requirements for credit issuance in order to qualify for ERCs under this Agreement. The process will require the Authority to provide to NC DAQ information and data necessary to quantify proposed emissions reductions. It will also require NC DAQ to recognize emission reductions and hold said reductions as credit for future use. Specifically this Agreement requires that:

1. The Authority shall provide the following information to NC DAQ to receive credit for voluntary emissions reductions:
  - a. Identification of the source or sources involved in the reduction;
  - b. A description of the activity or change that causes the reduction;
  - c. Quantification of the emissions reduction achieved by the activity or change;
  - d. A demonstration that the reductions are permanent and quantifiable, and
  - e. An explanation that the reduction is beyond that required by existing regulation.

When the Authority presents proposed emissions reductions to NC DAQ, NC DAQ will work with the Authority to ensure that sufficient information is provided, allowing NC DAQ to issue ERCs to the Authority. Reductions in criteria pollutant emissions (as well as precursor emissions), greenhouse gas emissions, and other emissions made after January 1, 2002 are eligible for credit.

2. To receive credits for early reductions, the Authority shall calculate annual emission reductions in a format agreed upon by both parties and shall:
  - a. Expend capital funds that directly contribute to emission reductions; or
  - b. Demonstrate that the Authority has caused by written order, changes in procedures or activities or equipment selection by its employees or those of its tenants that cause a resulting quantifiable reduction in applicable emissions.
3. Reduction credits are available only for reductions beyond existing State and Federal regulations.
4. NC DAQ shall review the information submitted by the Authority and shall determine within 90 days upon receipt if the reduction is creditable.
5. If NC DAQ finds that the reduction is not creditable, it shall explain to the Authority in writing why the reduction is not creditable.
6. If NC DAQ finds that the reductions are creditable, it shall record in a permanent file the amount of reduction that is creditable and shall notify the Authority in writing of the amount of reduction credited and the accumulative total of reductions that have been credited.
7. If proposed emission reductions are not made or are not going to be made as scheduled, the Authority shall notify NC DAQ. Moreover, if emission reductions are not continuing, the Authority shall notify NC DAQ and credit shall cease accrual.
8. ERCs created through implementation of this Agreement are for the exclusive use of the Authority, and while they are bankable, they are not transferable to other entities that may eventually participate in this system.
9. Credits will be calculated on a project-by-project basis, commencing at the onset of the proposed change. Credits based on purchases or activities that occur periodically will be based on options and standards available at the time of replacement. For example, if the Authority replaces a conventional gasoline vehicle with an alternative fuel vehicle or gas-electric hybrid, the ERC will be calculated by subtracting the annual grams per mile (g/m) emissions of the new vehicle from the annual g/m emissions of the vehicle that it replaced. Then, future replacement of that replacement vehicle would use options and standards available at the time of replacement. This may result in a decrease or increase of the credit obtained during the original replacement action, depending on the efficiency/cleanliness of the future replacement vehicle.
10. The Authority will conduct a review of calculation methods and reconcile accounts on an annual basis. The reconciliation will include any additions, deletions, and recalculations that have occurred in the previous year. The Authority will document and submit this review to NC DAQ annually. NC DAQ will review each annual submittal and provide written acknowledgement to the Authority. NC DAQ will readjust the cumulative total if necessary and shall notify the Authority in writing of the changes. Previously identified credit by NC DAQ does not preclude the possibility of future recalculations based on new, revised, or required calculation methodology changes dictated by State and/or Federal statute/regulation that may necessitate an adjustment in emission credit. NC DAQ has the final authority to determine ERCs and any continuing credit.
11. Credits generated through the implementation of this Agreement may be included in the State's planning process and be included in the State Implementation Plan (SIP) as voluntary or mandatory reduction strategies.

This Memorandum of Agreement reflects agreement by the Raleigh-Durham Airport Authority and the North Carolina Division of Air Quality.

**North Carolina Division of Air Quality**

**Raleigh-Durham Airport Authority**

By: \_\_\_\_\_  
*Signature*

By: \_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Print or type name and title  
and title*

\_\_\_\_\_  
*Print or type name*

Date: \_\_\_\_\_

Date: \_\_\_\_\_



## **MEMORANDUM OF AGREEMENT – SEATTLE / TACOMA AIRPORT**

This Memorandum of Agreement (Agreement) is made between **The Port of Seattle** (the Port) and the **Puget Sound Clean Air Agency** (the Agency).

### **Recitals**

#### ***The Port***

The Port operates the Seattle-Tacoma International Airport. The Port is implementing the Master Plan Update, which calls for improvements at the airport to be undertaken through 2010. The Port expects that implementing the Plan will reduce emissions for most of the criteria air pollutants. This is reflected in the Master Plan Final EIS and General Conformity evaluation (1997 Final Supplemental EIS, Appendix B, Figures B and C).

As Master Plan Update projects are undertaken, however, construction-related criteria air pollutant emissions necessary to provide these facilities may exceed the eventual emission-reduction benefits of the project during the construction years. As the Port fulfills its day-to-day operating responsibilities, and implements planned development projects, it will seek to identify additional opportunities to achieve even further emissions reductions. The Port anticipates that these opportunities may be available through refining project design, procuring and operating cleaner burning fuel equipment, or refining construction programs.

Although opportunities to further reduce emissions would likely increase the Port's anticipated capital expenditures, the Port wishes to consider them, provided there are incentives to make voluntary reductions. Under current air quality regulations, there are no incentives to make such voluntary emissions reductions. For instance, some potential emission reduction measures would require the Port to assume air quality obligations it would not otherwise be responsible for, which would increase costs, regulatory obligations, and potential liabilities. This is because entities other than the Port, such as airline tenants, currently control many potential sources for further emissions reductions. The Port may be able to achieve reductions by assuming responsibility for emission-causing services currently controlled by others, and providing them in a manner that cause fewer emissions. But doing so would likely increase the Port's own regulatory burden.

Depending on future circumstances, the Port may be required by general conformity or SEPA mitigation requirements to offset increases in construction or operating emissions necessary to meet specific airport operating needs. The surest way to provide offsets, if needed, would be to delay taking voluntary emissions reduction measures until the need for offsets is triggered by Master Plan Update projects that might increase emissions. Emission reduction credits issued by the Agency for voluntary

emissions reductions achieved in the near term, and available for use in the future to meet general conformity offsets requirements, provide a way to overcome this regulatory incentive to delay voluntary emission reductions, allowing for regional air quality benefits sooner.

Through this Agreement, the Port seeks the Agency's assistance in creating and using an enforceable process for banking emission reduction credits (ERCs) to make voluntary reductions more feasible. The Port's ability to make these environmentally beneficial improvements is contingent, in part, on whether it can obtain enforceable ERCs from the Agency for the emissions reductions it ultimately achieves, which can be used to meet emission offset requirements. As explained above, banked ERCs may be useful to the Port in the future in conjunction with implementing the Port's Master Plan Update. The Port expects to use any ERCs it obtains to meet general conformity or SEPA mitigation emissions offsets requirements, if applicable. It is anticipated that, to ensure air quality improvements, the Port will use 1.1 ERCs for each ton of emissions it offsets, which is consistent with EPA and Agency policy for using ERCs to meet nonattainment new source review requirements.

### ***The Agency***

The Agency is responsible for keeping the air clean in King, Kitsap, Pierce, and Snohomish Counties. The Agency, in collaboration with partner agencies, local governments and members of the community has begun to develop a Clean Air Partnership. The goal of this partnership is to deal with air quality in the most effective ways possible. This means that, in addition to fulfilling the traditional regulatory role, the Agency will seek out effective methods to develop and promote incentives that enable individuals and businesses to make clean air choices. Accordingly, the Agency encourages voluntary reductions by the Port.

ERCs are a formal recognition of qualifying emissions reductions. Banked ERCs are a mechanism to account for, at a future date, emissions reductions already achieved. The Agency's existing ERC regulation, however, is for use with the New Source Review program and therefore does not specifically address the Port's activities. The Agency desires, therefore, to create a process to allow the Port to bank ERCs for later use, to provide incentive for the Port to make emission reductions that are not otherwise required by law. The Agency intends to use a General Regulatory Order, issued under PSAPCA Regulation I, Section 3.03, as the appropriate mechanism for establishing this process.

**Agreement**

The Port and the Agency (the Parties) agree that projects that reduce criteria pollutant emissions on a voluntary basis and qualify for ERC issuance have local, and perhaps regional, air quality benefits. The Agency supports the Port’s effort to identify such projects, and recognizes that the Port’s ability to implement projects designed to reduce emissions on a voluntary basis is, in part, contingent on establishing a process to allow the Port to obtain, and use at a later date, enforceable emission reduction credits for the reductions.

The Parties, therefore, agree to prepare a General Regulatory Order to present to the Agency’s Board of Directors for approval pursuant to Agency Regulation I, Section 3.03. The Order will establish a process for the Port to bank and use ERCs. It will require that emissions reductions qualifying for ERCs are surplus, enforceable, quantifiable, and permanent, consistent with EPA guidance requirements for credit issuance. It will require the Port to provide information and data necessary to quantify proposed emissions reductions. And the Order will require that ERCs issued to the Port used to fulfill general conformity or SEPA mitigation requirements must be committed for use within a period of 10 years.

When the Port presents proposed emissions reductions to the Agency, the Agency will work with the Port to ensure that the process in the order is followed, allowing the Agency to issue ERCs to the Port. In the event SIP revisions are necessary to fulfill the purpose of this Agreement, the Agency will prepare and submit such revisions to EPA. Criteria pollutant emissions reductions made after the date this Agreement is signed by both Parties are eligible for credit.

This Memorandum of Agreement reflects agreement by the Port of Seattle and the Puget Sound Clean Air Agency.

**Puget Sound Clean Air Agency**

**Port of Seattle**

By: \_\_\_\_\_  
*Signature*

By: \_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Print or type name and title*

\_\_\_\_\_  
*Print or type name and title*

Date: \_\_\_\_\_

Date: \_\_\_\_\_



## **GENERAL REGULATORY ORDER – SEATTLE / TACOMA AIRPORT**

Under the authority of Puget Sound Clean Air Agency Regulation I, Section 3.03, General Regulatory Orders, this Order is issued to:

### **The Port of Seattle**

for the:

### **Seattle-Tacoma International Airport**

This Order establishes an enforceable process allowing The Port of Seattle (Port) to bank with, and use emission reduction credits issued by, the Puget Sound Clean Air Agency (Agency). This Order implements the 1999 Memorandum of Agreement between the Port and the Agency regarding emission credits for voluntary mobile and stationary source emission reductions implemented by the Port at Seattle-Tacoma International Airport, to be used in the future by the Port to meet general conformity or State Environmental Policy Act mitigation requirements. This Order is intended to be consistent with the Agreement. This Order creates the process by which the Port may bank and use emission credits. The credit banking rule in the Agency’s Reg. I, Sec. 6.08 does not apply to banking actions under the 1999 Memorandum of Agreement between the Port and the Agency and this Order.

1. Applying to bank emission reduction credits
  - (a) The Port may apply for emission reduction credits by submitting a written application to the Agency. The application must:
    - (1) Describe the changes or actions required to accomplish the claimed emissions reductions, and
    - (2) Provide an analysis quantifying the claimed reductions, in tons per year, by air contaminant. The baseline for quantifying reductions is “actual emissions,” as defined in the Agency’s Regulation I, before the change. The claimed reductions are those estimated to be achieved in the year after the change, unless the Agency agrees otherwise. The analysis will use relevant EPA guidance for quantifying emission reductions from mobile sources, where such reductions are claimed.

- (b) The Port will pay to the Agency an administrative charge of \$250 per application.

2. Issuing a Certificate of Title for emission reductions

- (a) The Agency will review Port applications for credit within a reasonable time assuring that the requested credits are quantifiable; enforceable; in excess of what would otherwise be required by federal, state or local regulations; and permanent, and may request additional information if needed to process the application.
- (b) Once an application for credit is approved, the Agency will issue a Certificate of Title to the Port. A Certificate of Title will:
  - (1) Establish conditions for each credit as needed to ensure that the reductions are enforceable and permanent;
  - (2) Contain a provision allowing for upset or emergency exceptions, if applicable;
  - (3) Give the Agency the right to request and review records, and conduct inspections, to ensure that the reductions are permanent; and
  - (4) Specify the issue date, expiration date, and the amount of credit, in tons per year, of each air contaminant for which credit is granted.

3. Using banked emission reduction credits

- (a) The Port may withdraw banked emission reduction credits for use by sending a letter to the Agency describing the purpose for the use and requesting to withdraw a specific number of credits. The number of credits requested will include the amount needed by the Port for offsets, plus 10% of that amount, to provide an additional environmental benefit.
- (b) The Agency will review the request and respond in reasonable time with a letter to the Port approving withdrawal of the requested amount of credits. The Agency will withdraw credits on a “first in, first out” basis. The Agency will track credit use by the Port and maintain records reflecting the number of credits available to the Port.
- (c) No public notice is required to deduct credits from the Port’s emission credit bank.

- (d) Emission reduction credits issued to the Port under this Order must be committed for use within a period of 10 years from the date the Agency issues a particular Certificate of Title.

4. Other requirements

- (a) The Port and the Agency will schedule and hold a meeting or conference call on roughly an annual basis, unless both parties agree not to meet, to discuss issues and actions relating to this Order.
- (b) The Agency may revise a Certificate of Title to reduce the amount of credits available to the Port or to revoke the credits if the Port fails to comply with conditions in the Certificate.
- (c) The Port must notify the Agency in writing in a reasonable time if it deviates from any condition in a Certificate of Title.
- (d) Action taken by the Agency as a result of reviewing an application for credit, including issuing a Certificate of Title, is not appealable to the Pollution Control Hearings Board.

## **The Wisconsin Voluntary Emission Reduction Registry**

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### **How To Make It Work For You**

**DRAFT DOCUMENT**

**Wisconsin Department of Natural Resources**

**February 2002**

#### Disclaimer

This document is intended solely as guidance and does not contain any mandatory requirements, except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

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## 1. Introduction and Purpose

The Wisconsin Voluntary Emission Reduction Registry is a brand new system established by the Wisconsin Department of Natural Resources. It is historic. This is the first time Wisconsin will systematically record and track voluntary emission reductions statewide.

Registering voluntary emission reductions may be relatively simple in some cases, but will often be fairly complicated. A number of decisions must be made before registering reductions. These decisions include how to determine the baseline, how to quantify emission reductions, whether and how to verify emission reductions, how the voluntary emission reductions may be used, and what records need to be kept. The emission reduction registry rule (chapter NR 437, Wis. Adm. Code) answers some of these questions very specifically. However, it doesn't necessarily provide information on all of the possible options. The purpose of this document is to provide that information, help registrants choose the best options for them, and interpret the registry rule.

## 2. Some Background and History – Where Did the Registry Come From?

The Wisconsin Voluntary Emission Reduction Registry was conceived in 1999 in the minds of some agency staff and was conveyed to the state legislature. It was born in the form of 1999 Wisconsin Act 195, which passed the legislature with a minimum of controversy. No one opposed it. It passed in April of 2000, was signed into law on May 17, 2000, and went into effect on June 1, 2000, when it became section 285.78 of the Wisconsin Statutes.

The law directs the DNR to “establish and operate a system under which the department registers reductions in emissions of greenhouse gases if the reductions are made before the reductions are required by law.” The law allows the department to register carbon sequestration from the creation or preservation of carbon reserves and to register avoided emissions resulting from energy efficiency measures and from the use of renewable energy sources. The law also allows the department to register voluntary reductions of mercury, fine particulate matter or other air contaminants. The law allows the registration of greenhouse gas emission reductions made as far back as 1991. And finally, the law directs the DNR to promulgate rules for the registry system.

In 2001 and 2002, the Department created a new chapter (chapter NR 437, Wis. Adm. Code, Voluntary Emission Reduction Registry), which specifies the details of how the registry will operate. Section 5 of this document presents and interprets those details.

## 3. What is the Wisconsin Voluntary Emission Reduction Registry?

The Wisconsin Voluntary Emission Reduction Registry exists primarily as a database, which lists the registered emission reductions. It also includes application forms, lists of quantification protocols, and rules (chapter NR 437, Wis. Adm. Code). All of registry components are contained on the registry web page at [www.dnr.state.wi.us/wiregistry](http://www.dnr.state.wi.us/wiregistry).

The registry provides a place where anyone can register a voluntary emission reduction. Registered reductions are officially recognized by the State of Wisconsin and may be used for various purposes, as explained in Section 6. How the registry works in practice is explained in Section 5.

## 4. Should I Register? (or What's in it for Me?)

### a. Why would I voluntarily reduce my air pollutant emissions?

Many companies around the world have made pledges to reduce greenhouse gas emissions. These include a number of large multi-national corporations, such as BP-Amoco, Dupont, and United Technologies. They also include smaller companies such as the more than 70 companies in Wisconsin which have pledged to reduce greenhouse gas emissions through the adoption of energy efficiency measures. So, why are these companies reducing greenhouse gas emissions when they are not yet required to do so? And, why should you reduce your greenhouse gas and air contaminant emissions?

There are many reasons to reduce greenhouse gas and air contaminant emissions voluntarily. By

doing this you can:

- **Get ahead of the curve**  
For greenhouse gases and some air contaminants (mercury and fine particulate matter), regulations which will require emission reductions are coming. By reducing your emissions early, you can prepare yourself for the future and get ahead of the crowd. This will give you good experience and can give you a competitive advantage.
- **Do the right thing and be a good neighbor**
- **Increase efficiency and save money**  
When you adopt energy efficiency measures to reduce greenhouse gas and air contaminant emissions, you improve efficiency and use less energy. By using less energy, you save money.
- **Improve profitability and increase competitiveness**  
By increasing efficiency, your product or service is produced or provided at a lower cost with less energy input. This will increase your profitability and will make you more competitive.

b. Why should I register my emission reductions?

If you choose to reduce emissions voluntarily, then it is certainly in your best interest to register your emission reductions. There are a number of good reasons why you will want to do that, which are listed and discussed below.

1. Baseline Protection

The first, and probably the most important, reason to register your voluntary emission reduction is to protect yourself. Unfortunately, if you reduce emissions early, you could be punished later if regulations require you to reduce emissions and the regulations don't recognize the emission reductions you've already made. This has happened in the past and is one of the main reasons why we are operating the emission reduction registry. If your voluntary emission reduction is registered with the state, it is much more likely to be recognized and taken into account later when regulations requiring those emissions to be reduced go into effect. We can't guarantee that your reduction will count towards future requirements (especially federal requirements), but we will do our utmost to ensure that your voluntary early emission reduction is recognized and counted under any future state and federal regulations or laws.

2. Public Recognition

In addition to protecting yourself, there are other reasons to register your VER. One is public recognition of your good deeds. This can count for a lot, especially when your customers are looking for green companies to do business with.

3. Central Listing of Emission Reduction Purchase Opportunities

Another reason to register is to draw market attention to your reductions. Some emission reductions may be marketable as offsets for those who can't afford to reduce their emissions or want to increase emissions in non-attainment areas (if you are located in a non-attainment area). It is expected that people looking for emission reductions to purchase will use the emission reduction registry to locate emission reductions.

You must be careful in selling or buying emission reductions. Markets with clear rules have been established for some pollutants, notably sulfur dioxide in the U.S. The sulfur dioxide allowance trading market is well established in the U.S. under rules carefully spelled out in federal law and regulations. This market has been very successful and has resulted in significantly lowering the costs of reducing SO<sub>2</sub> emissions in the US. Some limited trading in nitrogen oxide and volatile organic compound emission reductions is allowed in some parts of the country (e.g., New England and California), and NO<sub>x</sub> trading will soon be allowed nationwide.

However, for gases or air contaminants which have no established emission reduction trading

markets or trading rules, you trade at your own risk. The main example of this right now is greenhouse gas emissions, where no trading rules have been established, but fledgling markets are developing, and a limited number of private trades have occurred. A greenhouse gas cap and trade system may require you to reduce your greenhouse gas emissions. If you sell your early emission reduction, you may be required later to further reduce emissions. You may want to keep your emission reduction in the registry for future use.

c. Limitations of Registry

In addition to the benefits of registering emission reductions, there are a number of limitations to the registry.

First, it does not guarantee baseline protection. The DNR cannot guarantee that any registered emission reduction will be recognized and taken into account by any future laws or regulations (especially federal laws and regulations). However, we will do our utmost to ensure that your voluntary early emission reduction is recognized and counted under any future state and federal regulations or laws. If your voluntary emission reduction is registered with the state, it is much more likely to be recognized and taken into account later when regulations requiring those emissions to be reduced go into effect.

Secondly, there will be minimal review of emission reductions by DNR staff and no official DNR stamp of approval. Thus, the registry does not guarantee the quality or veracity of registered emission reductions. Registered reductions may not meet the rigorous requirements of the laws or regulations which they may be used to meet in the future. The registry also does not fulfill the regulatory requirements for credit under the State Implementation Plan and other existing regulatory programs, including offset programs in non-attainment areas. Additional work may have to be done to verify the emission reductions and bring them up to the standards required in order to use the emission reduction for any purpose.

## 5. How Does the Registry Work?

The registry is designed to be simple and easy to use, once you know the rules. The rules are contained in Chapter NR 437, Wis. Adm. Code. In the following sections, we explain and interpret the rules.

a. Eligibility

1. Which Air Pollutants are Eligible?

Voluntary reductions in the emissions of all greenhouse gases and most criteria air contaminants are eligible to be registered. Note that reductions of most hazardous air pollutants are not eligible to be registered. The eligible air contaminants are listed in Table 1 in NR 437 along with the registration threshold for each gas. In order to be registered, the voluntary emission reduction, or VER, must be equal to or greater than the threshold level in Table 1 for the greenhouse gas or air contaminant being reduced. Note that VERs may be aggregated from several or many sources in order to meet or exceed the registration threshold given in Table 1 [NR 437.03(4)(c)]. Also note that mercury collected through a mercury collection and disposal project may be registered as an emission reduction if the mass of mercury collected is greater than ten pounds [NR 437.03(4)(d)]. All greenhouse gas VERs are reported as carbon dioxide equivalents, so reductions in GHG emissions are always lumped together.

Some emission reduction actions result in reductions of multiple air contaminants and/or greenhouse gases. In this case, if the VER of any one of the air contaminants or greenhouse gases equals or exceeds its registration threshold level, then all of the VERs may be registered. This is the only exception to the registration threshold requirement.

2. Who May Register an Emission Reduction?

Any person may register VERs. Person is broadly defined under Wisconsin law and includes individuals, corporations, large businesses, small businesses, commercial enterprises, retail

stores, environmental groups, clubs, organizations, municipalities, towns, government agencies, and others. Basically, a very broad group is eligible to register VERs.

3. What Emission Reductions are Eligible to be Registered?

Most VERs are eligible to be registered. However, there are some limitations on eligible VERs. These limitations are discussed below.

a. The VER must be voluntary and not required by law. Law is defined in the regulation to mean “any federal or state statute, rule, order, mandatory emission limiting condition in an air permit or other legal requirement.” A VER may also be registered if it goes beyond what is required by law.

From an emission reduction requirement standpoint, there are two types of VERs: those which have no existing emission reduction requirements and those which do have existing emission reduction or emission control requirements. For example, there are currently no laws in existence requiring greenhouse gas or mercury emissions to be reduced. Thus, any reduction in emissions of greenhouse gases and mercury is considered to be voluntary and eligible for registration, as long as it meets all the requirements of NR 437. For most other air contaminants, there are laws in existence requiring emission reductions or specifying emission limits. If the emissions of these substances are reduced beyond what is required by law, the amount reduced beyond the required reduction is considered to be a VER and is eligible to be registered. So, emission reductions which are not required by law, or emission reductions which go beyond what is required by law are eligible to be registered.

This can be somewhat confusing, and there are situations where it is not clear whether an emission reduction is eligible for registration. The emission reduction registry regulation helps to clarify this confusion by presenting examples of eligible reductions in NR 437.03(1)(a) through (d). These examples are explained here.

1. NR 437.02(1)(a) “VERs that result from actions taken to comply with a law that result in reductions of greenhouse gas or air contaminant emissions that are not required by or go beyond those required by law.”

This example is not very clear. It is meant to clarify the situation where a person takes an action to comply with a law which coincidentally results in emission reductions. Those emission reductions may be registered. In this case, the law does not directly require reductions in the greenhouse gases or air contaminants registered.

A specific example would be when a law requires an electric utility to generate some of its electricity using renewable energy, which produces no air pollution. This law doesn't require the company to reduce any greenhouse gas or air contaminant emissions, just to provide renewable electricity. But emissions are reduced as a result of taking that action, and those emission reductions may be registered.

Another example would be the situation where a company is required by law to reduce emissions of one air contaminant, like sulfur dioxide. If the company complies with that law in a way that reduces not only sulfur dioxide emissions, but also reduces emissions of other air pollutants, then these ancillary emission reductions may be registered.

2. NR 437.03(1)(b) “VERs that are made after an applicable law is in effect but before the reduction is required by law.”

Many times, when an environmental law is passed, it contains compliance deadlines, which can be several years in the future. Emission reductions made after the law is passed but before the compliance deadline are VERs and may be registered. Emission reductions made after the compliance deadline may not be registered, unless they go

beyond the emission reduction requirements of the law.

3. NR 437.03(1)(c) “VERs that are reflected in an air pollution control permit, as long as the level of reduction is beyond what is required by law.”

Often, when an action is taken to reduce air contaminant emissions, whether it is voluntary or not, DNR and EPA regulations require that the air pollution control permit for the facility be rewritten to reflect the new lower emission level. So, a VER can result in a new permit requirement, which could be considered to be a legal requirement. But, because of the way that “law” and “mandatory emission limiting requirement in an air permit” are defined in NR 437, a permit condition is not always considered to be a legal requirement. NR 437.03(1)(c) clarifies the situation where a voluntary action is taken to reduce emissions and the reduced emission rate is then put as a condition in an air pollution control permit. In this situation, the VER may be registered, as long as the emission reduction goes beyond what is required by law.

Here is a concrete example. An automobile assembly plant is required by law to reduce VOC emissions by 75%, and this emission rate is reflected in the company’s air pollution control permit. The company installs a stack gas incinerator, which reduces VOC emissions by 95%. The permit is then rewritten to require the new emission rate. The extra 20% reduction goes beyond what is required by law. Even though it is required in the permit, it is considered to be a VER and may be registered.

4. NR 437.03(1)(d) “VERs that are part of a contractual agreement with the department, as defined within the contractual agreement.”

Some companies are working with the Department to develop cooperative agreements in which the company agrees to reduce air contaminant emissions by a specified amount, usually a greater reduction than what is required by law. The part of the reduction which goes beyond what is required may be registered if the agreement defines it as a voluntary reduction.

- b. The VER must result from an action to reduce emissions. It cannot be an emission reduction that just “happened.” Thus, emission reductions which result from variations in weather and/or the economy are not eligible for registration. For example, if Company A runs a facility which is heated by coal-fired boilers, they emit many air pollutants from the burning of coal. Suppose a very cold winter is followed by a very mild winter. During the cold winter, the company would need to run the boilers more and burn more coal and emit more air pollution to heat the plant. During the mild winter, the boilers would run less and emit less air pollution. In this case, the emission reduction is not eligible to be registered because it did not result from any action taken by the company to reduce emissions. Some examples of acceptable emission reduction actions are given in NR 437.03(2)(a) through (k), but many other actions are also eligible.
  - c. The emission reduction action and the emission reduction must occur in Wisconsin. Emission reductions which occur outside Wisconsin are not eligible to be registered.
  - d. For greenhouse gases, the emission reduction may be registered if it occurred after 1990. For air contaminants, the emission reduction may be registered if it occurred after 1993. Thus, emission reductions may be registered retroactively.
- b. Quantification of Emission Reductions
- Emission reductions are quantified by subtracting the emissions after the emission reduction action is taken from the emissions before the action is taken. So, you need to quantify emissions both before and after the emission reduction action is taken. This can be relatively simple or it can be very complicated.

NR 437 requires emissions and emission reductions to be quantified using either the quantification protocols listed in NR 437.04(2)(a) or alternative protocols submitted by registrants [see NR 437.04(2)(b)]. A quantification protocol is a replicable and workable method or set of methods for measuring, calculating, and/or estimating the quantity of emissions.

There are two methods for quantifying emissions: you can measure them or you can estimate them. Measuring emissions involves either continuous emissions monitoring or source emission testing, also known as stack testing. Estimating emissions normally involves the multiplication of source activity data by emission factors to calculate emissions. You may also estimate emissions using a mass balance technique (see NR 437.04(2)(a)3).

Measuring actual emissions is preferred to estimating emissions. Continuous emissions monitoring is preferred over periodic stack testing. Stack testing is an acceptable way to measure emissions, as long as the stack test results are representative of normal emissions during normal operations. In Wisconsin, any continuous emissions monitoring must be done in accordance with the methods specified in sections NR 439.09 and 439.095(6), Wis. Adm. Code. Source emission testing must be performed in accordance with sections NR 439.07 and 446.04, Wis. Adm. Code. These are the first two quantification protocols listed in NR 437.04(2)(a).

Estimating emissions normally involves obtaining appropriate activity or fuel use data for the emission source and finding the correct emission factors which apply to the emission source or process under consideration. The activity data are multiplied by the emission factors to obtain the estimated emissions.

Emission factors are usually obtained from the results of stack tests performed on many similar sources. Many different quantification protocols contain emission factors for various emission sources. NR 437.04 lists 18 quantification protocols (NR 437.04(2)(a)4 through 21) which provide emission factors that can be used to estimate baselines and VERs. Remember that these protocols are to be used only if the emissions cannot be measured and must be estimated.

In some cases, your emission source or process may be so unique that none of the emission factors or methods in these protocols can be used to estimate your emissions. Or you may find that the emission factors in these protocols are not as accurate as other emission factors that you know of. In this situation, NR 437.04(2)(b) allows registrants to use alternative protocols. You need to submit a copy or description of the protocol, documentation of its accuracy and replicability, the name and address of the organization that developed the protocol, and whether the protocol has been approved or accepted by any government agency or other organization for registering VERs. The Department will maintain a list of alternative quantification protocols submitted and will make the list public so others can locate and use the protocols.

If you find that there is no protocol available for quantifying an emission reduction, then you may register the emission reduction action without quantifying the emission reduction itself. When an applicable protocol becomes available, you can then quantify and register your emission reductions for current and previous years.

c. Baseline Determination

1. Standard Baseline

The registry rule specifies how the standard baseline is determined for both emission reductions and for avoided emissions. Avoided emissions are the result of activities which indirectly reduce emissions, such as energy efficiency measures and renewable energy projects.

For emission reductions, the baseline specified in the rule is the average emissions for the two years immediately preceding the year in which the emission reduction action is taken. A two-year average was chosen rather than one year in an attempt to avoid the possible use of a non-representative year as the baseline. The use of a non-representative year could result in an over- or under-estimated emission reduction.

Energy efficiency measures and renewable energy projects produce emission reductions (or avoid emissions) at the electric utility power plants which supply the electricity in the area where these projects are located. So, the standard baseline for these projects is specified in the rule to be the system-wide average electric utility emissions for the two years prior to the year in which the action is taken. The system-wide average is used because it is usually impossible to determine exactly where the electrons going to a specific facility are from. However, for energy efficiency measures, if you do know exactly which power plant your electricity comes from, then you can use the emissions from that power plant for your baseline emissions. This is actually preferable to using the system-wide average, but it is usually not possible to do.

## 2. Alternative Baselines

The two-year period immediately preceding the emission reduction action could also be non-representative of normal operations and emissions. If this is the case, then you may choose an alternative baseline which is representative of normal operations and emissions. The alternative baseline could use a different set of years, or one representative year. The year or years do not have to be in the past. You can use a business-as-usual projection of future emissions. But this must be done carefully and must be well documented. You may want to use this type of baseline when your emissions are growing steadily each year, so that any years in the past are not representative. Historic years are more representative in more stable situations, such as a base-loaded power plant.

## 3. New Sources

If a new source is permitted and built, it **may** be able to register emission reductions. In this case, there are no prior emissions, so the standard baseline does not work. If there are emission limits or performance standards which the source must meet, then these are used as the baseline. The emission reductions which are below the emission limits or performance standards may be registered. If there are no applicable emission limits or performance standards, then the baseline is determined as the industry or activity average emissions or emission rate. This may be difficult or impossible to determine. It is preferred that the average emissions for the industry or activity include only newer facilities, which tend to use cleaner technologies and processes and have lower emissions (but not always). Average emissions for older facilities may produce a baseline that is too high.

The reason for allowing new sources to register emission reductions (when they actually represent emission increases) is to encourage new sources to adopt processes and technologies which are cleaner and less polluting than the norm for the particular industry. A new source may only register an emission reduction if it emits significantly less emissions than a typical newer facility. In other words, it can only register an emission reduction because it is emitting significantly less than it would otherwise have if it used the normal industry practices and processes. This is, in essence, the same as using the projected business as usual baseline.

## d. Verification

Verification of emission reductions or baselines is not required to register a VER. However, if you use your registered emission reduction in the future to meet an existing or future regulatory requirement, the emission reduction must meet the standards specified in the requirement. This may require verification or certification of the emission reduction. And if you plan to trade an emission reduction, it must be verified by a third party. You should consider having your emission reduction verified before registering it, if you plan to use it for any purpose which might require it to be verified. Verification is more easily done soon after the emission reduction is made rather than several years later.

To verify means to establish the truth, accuracy, or reality of (in this case) a voluntary emission reduction. A thorough and rigorous verification would involve the following:

- inspecting the emission source to ensure that the emission reduction action was taken.
- checking to ensure that any source emission testing or other measurement was done correctly and

- properly. This is best done by witnessing the test procedure while it is being done.
- making sure that the appropriate quantification protocol is used and that it is properly applied,
- checking the applicability and accuracy of any emission factors used,
- making sure the baseline is properly determined,
- checking to see that all calculations are done correctly, and
- checking to ensure that all requirements of chapter NR 437 have been met.

This type of rigorous verification is best done by a third party auditor, but can be done by the emission source itself (self-verification). A less rigorous verification would involve doing only some of the steps listed above. The rigor of the verification will vary depending on legal requirements.

e. Carbon Sequestration

Carbon sequestration means the establishment or enhancement of a carbon reserve. A carbon reserve is any system that takes in and stores more carbon from the atmosphere than it releases to the atmosphere [see the definitions in NR 437.02(3) and (4)]. A forest or a prairie or other terrestrial ecosystem is a carbon reserve. Carbon sequestration projects typically involve planting or protecting forests, but other projects are possible. Sinking carbon dioxide collected from a power plant smokestack into the ocean is a form of carbon sequestration, assuming the carbon dioxide remains where it is put and doesn't find its way back into the atmosphere.

To establish a carbon sequestration project, the project area and boundaries must first be clearly defined. The amount of carbon stored in the project area at the beginning of the project must then be determined. This is the baseline carbon storage for the project. The carbon stored at the beginning of the project (baseline) and the carbon sequestered during the project must be calculated and reported as carbon dioxide. The amount of carbon stored during the project may be registered.

The quantification of the amount of carbon sequestered during the project is complicated and involves a fair amount of uncertainty. Quantification protocols do not yet exist for many carbon sequestration activities. When there is no quantification protocol available, the action taken may be registered without quantifying the amount of carbon sequestered. When and if quantification protocols become available, then the amount of carbon sequestered may be calculated for the project.

Note that the amount of carbon sequestered annually in terrestrial ecosystems is variable and uncertain. Thus, annual reporting of carbon sequestered may not be possible or advisable. It may make more sense to measure the carbon sequestered over a longer time period (5 or 10 years) and then determine the annual average carbon sequestered to report to the registry.

f. Application Procedure

Emission reductions are registered on an annual basis. An emission reduction must be registered every year, even if it doesn't change from year to year.

The application for the initial registration is designed to be simple and easy. After the emission reduction is achieved and properly quantified, the registrant must complete a four-page application form which is available in hard copy or electronic form. Paper application forms are submitted to:

The Wisconsin Emission Reduction Registry  
Bureau of Air Management  
Wisconsin Department of Natural Resources  
PO Box 7921, Madison, WI 53707

Electronic application forms are submitted to: [registry@dnr.state.wi.us](mailto:registry@dnr.state.wi.us)

The annual re-registration is called the registration update in NR 437. The registration update is also easy to do. If the previously registered emission reduction has not changed, then all you need to do is submit a written statement that the emission reduction is accurate and meets all the requirements of NR 437, and let us know the year for which the VER is being registered.

If the VER has changed from the previous year, you need to submit an explanation of the changes, the recalculated VER, and a signed statement that the VER is accurate and meets all the requirements of NR 437.

g. Department Review

Upon receipt of an application for either an initial registration or a registration update, the Department has 90 business days to determine whether the application is complete, i.e., whether the application contains all of the information required under NR 437.07. The Department must notify the applicant within 30 business days of its determination. If the application is determined to be incomplete, the Department must tell the applicant exactly what information he or she must submit to complete the application.

The Department will review the application primarily for completeness, but will also do a cursory review to make sure the application makes sense, that acceptable protocols were used to calculate or measure emissions, that baselines were properly determined, and that all the requirements of NR 437 have been met. If problems with the application are found, the department may ask the applicant to make corrections.

h. Registration

When a completed application is received, the Department will register the emission reduction. This involves entering the pertinent data about the emission reduction into the registry database. This database will exist on the DNR web site at [www.dnr.state.wi.us/registry](http://www.dnr.state.wi.us/registry) and will also be available in paper copy. All of the registry information will be publicly available. The data entered in the database will include the name of the registrant, the location(s) of the emission source(s), the baseline emissions, the emission reduction, whether and how the emission reduction was verified, and other pertinent information.

i. Record Keeping and Documentation

Emission reduction registrants are advised to keep meticulous and detailed records of all information pertinent to the emission reduction and the emission reduction activity. This information will be needed if and when the emission reduction is used. This is especially true if the emission reduction has not been verified and the registrant may want to have it verified at some point in the future. It is much easier to verify an emission reduction at the time when the emission reduction is made than to do it several years later.

Meticulous records and documentation will be needed if the emission reduction is used to meet an emission requirement or if it is sold to someone else. Verification of the emission reduction will also likely be required if the emission reduction is used for any purpose.

j. Correction of Historic Data

If you register an emission reduction and later discover that the emission reduction is not correct, or better information becomes available to more accurately calculate the emission reduction, you may correct a registered reduction. You just need to provide the new information, the corrected VER, and a signed statement to the Department in accordance with section NR 437.07(6).

**6. How Can I Use My Registered Emission Reductions?**

Each regulatory program has its own specific requirements. This section discusses the requirements of existing regulatory programs and the likely requirements of future regulatory programs. It identifies some of the things you can do to prepare for those regulatory requirements. In all cases, keeping detailed records and documentation, in addition to the information provided in the registry, is recommended, even though it is not required by then registry.

a. Possible Future Regulatory Programs

1. Greenhouse Gas Programs

It is likely that greenhouse gas emission reductions will be required at some time in the not-

too-distant future. The greenhouse gas regulations will probably take the form of a national cap and trade system. A national cap on greenhouse gas emissions will be established. Individual sources may be assigned emission reductions or issued CO<sub>2</sub> emission allowances, similar to the SO<sub>2</sub> allowances issued under the acid rain program. If emissions are reduced below what is required, the excess emission reductions may be sold or banked. The emission reduction trading market will have rules set by the government. A national emission reduction registry may be used to track emission reductions. Greenhouse gas emission reductions registered in the Wisconsin emission reduction registry may be recognized under the national program, depending on what the rules of the national program are.

2. Fine Particulate matter
- b. Ozone Programs
  1. SIP Credit
    - a. Maintenance Plan
    - b. Rate of Progress
    - c. Attainment Demonstration
    - d. Contingency Plan
    - e. Conformity
  2. VOC and NOx Emission Offsets
    - a. EPA Quantification Requirements and Approved Methodologies
    - b. Baseline Determination
    - c. Shutdowns
  3. Reducing Concentrations in Potential ozone Nonattainment Areas
  4. NOx Trading
  5. Wisconsin Partners for Clean Air
  6. EPA Guidance Documents – what they are, where to locate them
- c. Wisconsin's Proposed Mercury Regulation
  1. Baseline Determination
  2. Quantification Requirements
  3. Mercury Product Collection Programs
- d. Air Permits
  1. Major/Minor Source
  2. PSD
  3. Netting

## 7. Other Issues

- a. Shifting emissions to another state

Emission reductions which result from shifting emissions to another state or country may not be registered in the Wisconsin voluntary emission reduction registry.



# **PHILADELPHIA INTERNATIONAL AIRPORT**

## **Clean Fuel Project**

