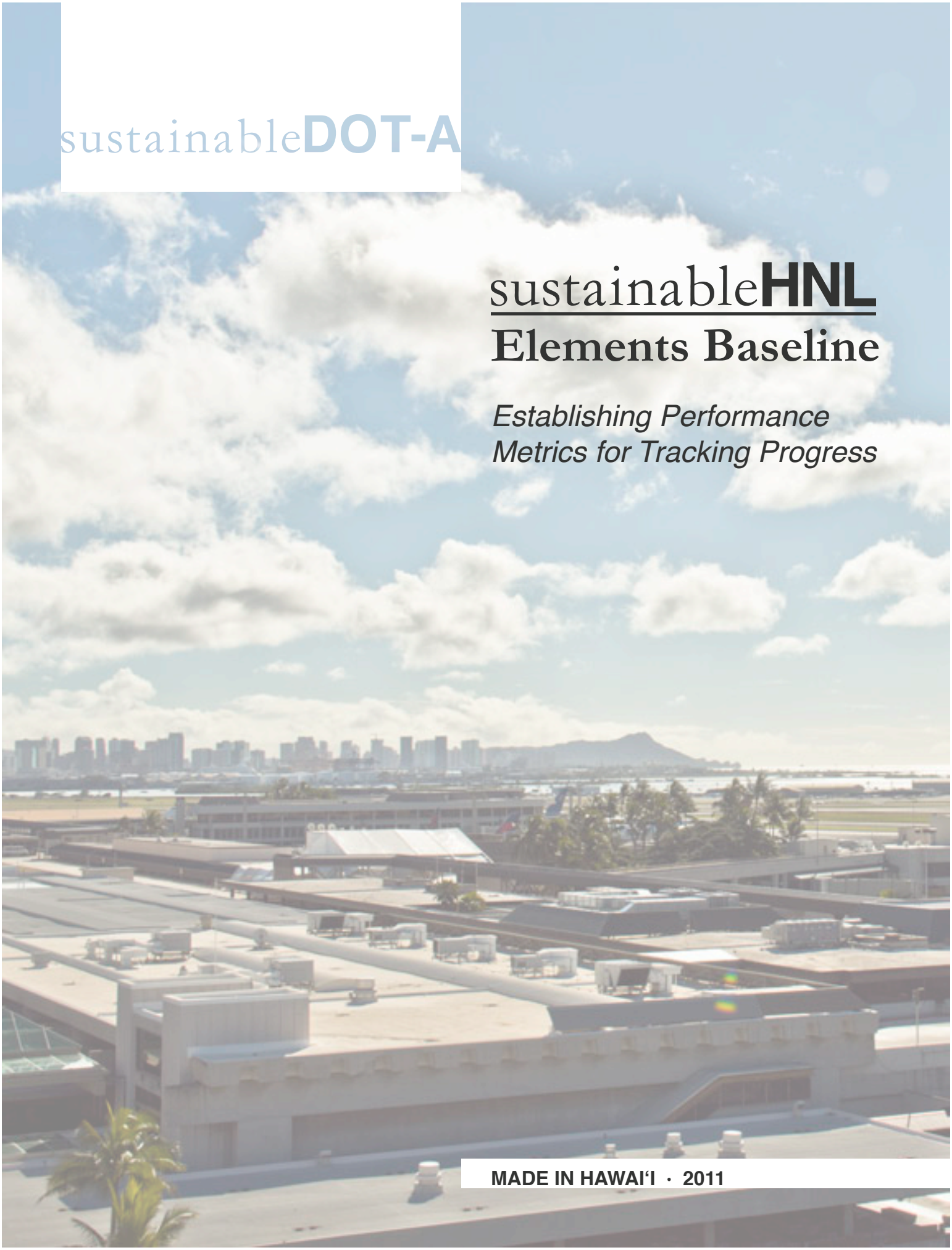
sustainable**DOT-A**

sustainable**HNL**
Elements Baseline

Establishing Performance Metrics for Tracking Progress



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sustainable**DOT-A**

sustainable**HNL**
Elements Baseline

Establishing Performance Metrics for Tracking Progress

Sustainable DOT-A Guiding Resources

Program Profile

Hawai'i Sense-of-Place Primer

Sustainable High-Performance Guidelines

Cultural Appropriateness Guidelines

MADE IN HAWAI'I · 2011

Created in partnership between the Department of Transportation-Airports Division and the KYA Sustainability Studio.

STATE OF HAWAI'I
2011

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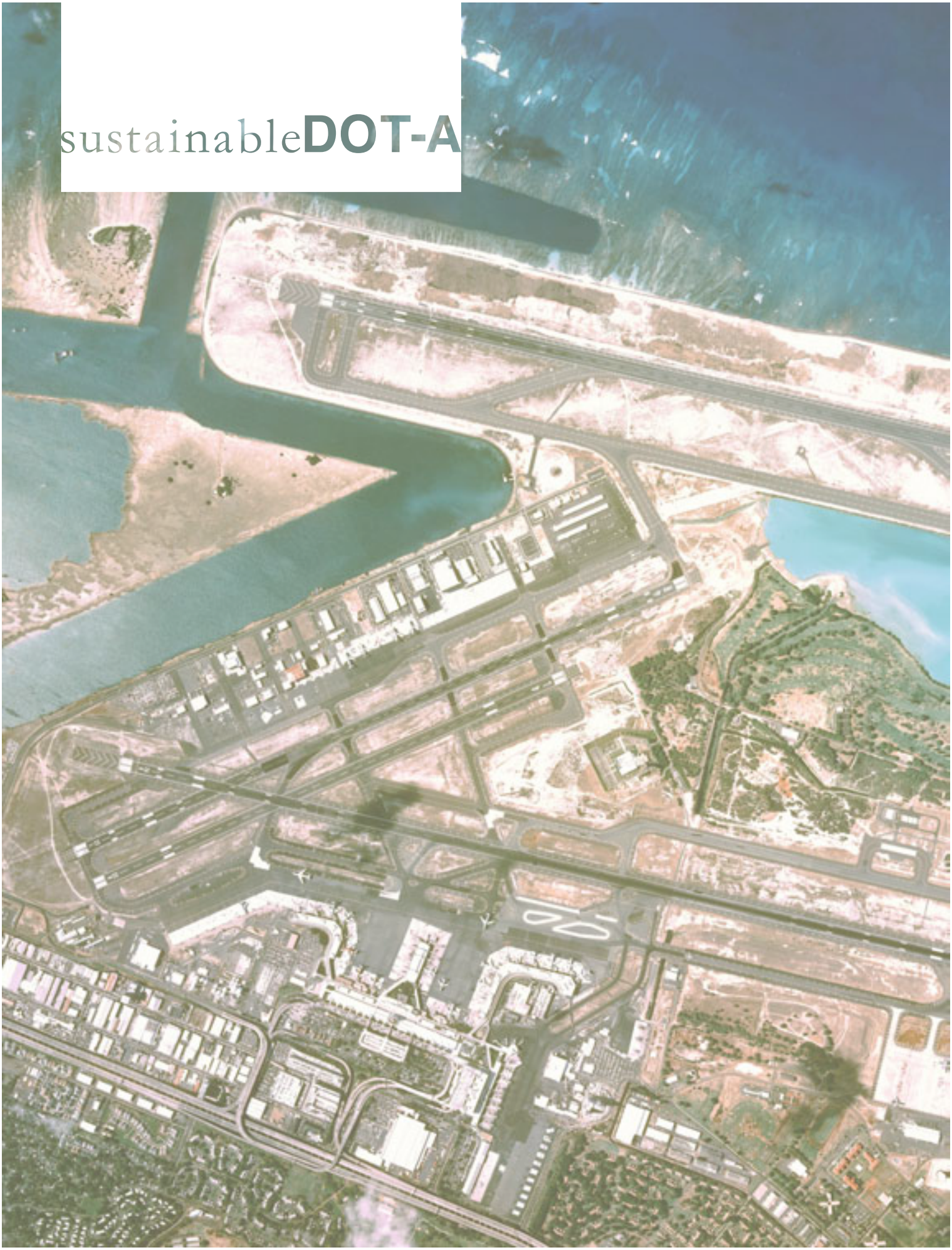
sustainable**DOT-A**



PURPOSE

The *SustainableHNL Element Baseline* is a strategic planning tool that assesses both the challenges and achievements of HNL through the lens of sustainability. The report provides a basis for understanding the current organizational practices and opportunities for sustainability program development at HNL. As DOT-A develops its sustainability program, SustainableDOT-A (sDOT-A), this report establishes baseline performance metrics for Hawai'i's airports to measure progress towards Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS). In demonstration of DOT-A's leadership role in sustainability, the *SustainableHNL Elements Baseline* provides a platform for open communication and transparency among HNL stakeholders through balanced reporting of challenges and achievements.

What is an Element Baseline?

In efforts to align HNL's commitment to airport sustainability with local initiatives and legislation, as well as the aviation industry at large, the sHNL Committee identified four major area of focus, or *Elements*—Carbon, Water, Waste, Energy. These were chosen based on their impacts and opportunities for improving the financial, environmental, and sociocultural performance of HNL. Each Element provides a baseline—a set of critical observations, performance metrics, and indicators used as a benchmark for measuring progress over time. As sHNL develops, the scope of each Element may be refined as standards for data reporting improve internally at DOT-A and in the aviation sector at large. In the future, the sHNL Committee may identify additional Elements through ongoing stakeholder engagements.

2009-2010 REPORTING BOUNDARY

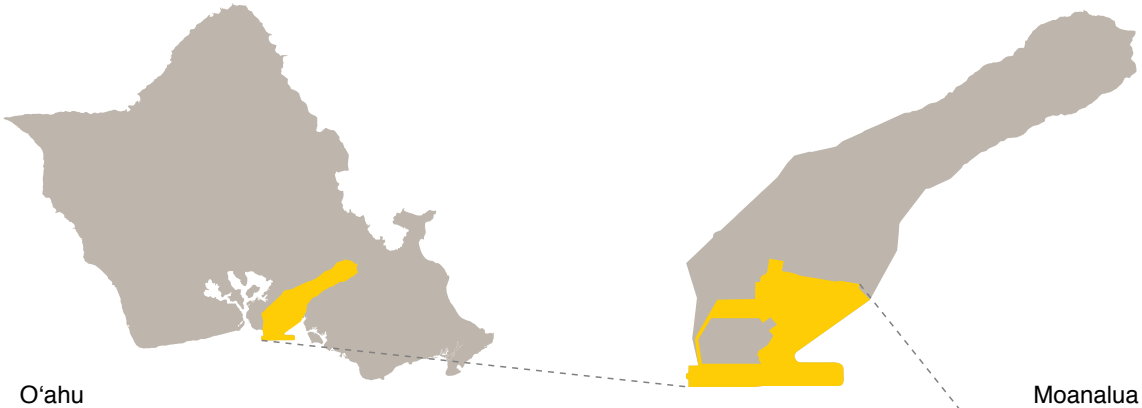
HNL is located in Honolulu, Oʻahu, within the ahupuaʻa of Moanalua, once renown for its abundant taro fields and fishponds. Important geo-references include the volcanic craters—Makalapa, Āliamanu, and Āliapaʻakai—and Puʻu Keahiakahoe (Stairway to Heaven), which is among the tallest peaks of the Koʻolau Mountain Range. The name of the wind that passes through is Hoʻeʻo.

SustainableHNL is geographically defined by a program boundary, which facilitates stakeholder engagement while providing a basis to measure and quantify the impacts and opportunities of HNL airport activities. The HNL-SC invited all stakeholders operating within the program boundary to share their efforts and successes as the industry moves toward sustainability. The HNL-SC may later choose to modify the scope of the boundary as the program evolves.

The program boundary includes all facilities and operations located on DOT-A property and runways east of Elliot Street, south of Aolele Street, south of Kamakahi Street, and along Lagoon Drive. The boundary excludes water bodies, Hickam Air Force Base, Mamala Bay Golf Course, the Federal Detention Center and tenants operating north of Aolele Street and along Koapaka Street.

This area encompasses the majority of the HNL campus, one of 15 airports managed by DOT-A. HNL covers 4,520 acres of fast and submerged land, which contain a total of four active runways and over 450,000 square feet of warehouse space, 1,000,000 square feet of cargo ramp area, and 3,750,000 square feet of terminal space. Within this area includes nine cargo terminals and four passenger terminals (overseas, international, interisland, commuter). These terminals contain a total of 47 aircraft gates, 29 of which accommodate wide-body aircraft. Transportation between terminals, main lobby areas, and baggage claims are provided by a free shuttle service, the Wiki-Wiki.

HNL is home-base to numerous enterprises that contribute directly to the State economy—including air carriers and all-cargo airlines, terminal concessionaires, fixed base operators, government agencies, and ground transportation and tour operators. Additional amenities include airline lounges, retail stores, restaurants and bars, barber-shop, business center, post office, sheriffs office, gasoline station, and other miscellaneous business facilities. HNL supports approximately 550 full-time employees and 15,000 local jobs. At any given hour, the airport serves an estimated 10,000 people, with a daily average of 60,000 passengers traveling through.


O‘ahu
Moanalua


Honolulu International Airport
QUEEN LILI'UOKALANI FREEWAY
NIMITZ HIGHWAY
AOLELE STREET
ELLIOT STREET
HICKAM AIRFORCE BASE
HICKAM AIRFORCE BASE
MAMALA BAY GOLF COURSE
LAGOON DRIVE

sustainable**HNL**

2009-2010 PROGRAM BOUNDARY

1. Main Terminal (international + overseas)
2. Commuter Terminal / New Mauka Concourse
3. Interisland Terminal
4. Ewa Concourse
5. Central Concourse
6. Diamondhead Concourse
7. Maintenance Baseyard
8. Cargo Facilities
9. South Ramp
10. ARFF #1
11. ARFF #2
12. Car Rental Facilities
13. INTL Parking Structure
14. OST Parking Structure
15. Runway 4L/22R
16. Runway 4R/22L
17. Runway 8L/26R
18. Runway 8R/26L
19. Fuel Farm

Excluded:
20. Federal Detention Center


QUEEN LILI'UOKALANI FREEWAY
NIMITZ HIGHWAY
AOLELE STREET
LAGOON DRIVE
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Aloha
HONOLULU INTERNATIONAL AIRPORT

DEPARTMENT OF TRANSPORTATION—AIRPORTS DIVISION

HONOLULU INTERNATIONAL AIRPORT
2009-2010 STATISTICS

Airport Activity

- 18,168,746 passengers
- 427,292 tons cargo + mail
- 274,434 takeoffs and landings
- 60,000 passengers daily
- 550 DOT-A employees
- 15,000 airport employees

Non-Terminal Space

- 4,520 total acres
- 2,520 acres (fastland)
- 2000 acres (submerged)
- 19 passenger security lanes
- 3,728 public parking spaces

4 asphalt runways

- 8L/26R: 12,300 feet x 150 feet
- 8R/26L: 12,000 feet x 200 feet
- 4R/22L: 9,000 feet x 150 feet
- 4L/22R: 6,700 feet x 150 feet

2 water runways

- Sealane 8: 5,000 feet x 300 feet
- Sealane 4/22: 3,000 feet x 150 feet

Airline Services

- Air Cargo & Package Express
- Aircraft Charter, Rental & Leasing
- Aircraft Rescue and Fire Fighting
- Aircraft Maintenance
- Flight Training
- Fuel
- Ground Support and Services
- Transient Parking

Terminal Space

- 3.75 million square feet
- 4 passenger terminals
- 9 cargo terminals
- 47 aircraft gates
- 29 overseas terminals
- 29 wide-body gates
- 13 Interisland Terminal gates
- 5 Commuter Terminal gates

Passenger Services

- Airline Lounges
- Baggage Carts
- Baggage Services
- Business Center
- Conference Rooms
- Curbside Check-in
- Duty Free Shopping
- Food and Beverage
- Fresh Flowers & Leis
- Greeting Services
- Medical Services
- Newsstands/Bookstores
- Retail Shopping
- Wireless Internet System

Number of Businesses

- 700 businesses (contractors, vendors, or on-site operations)

Destinations Connected (53)

Anchorage, USA
Apia, WSM
Atlanta, USA
Auckland, NZL
Bellingham
Calgary, CAN
Chicago-O'Hare
Chuuk, FSM
Dallas/Fort Worth, USA
Denver, USA
Detroit, USA
Guam, GUM
Hilo, HAWAIʻI
Houston-Intercontinental, USA
Kahului, HAWAIʻI
Kalaupapa, HAWAIʻI
Kapalua, HAWAIʻI
Kiritimati, KIR
Kona, HAWAIʻI
Kosrae, FSM
Kwajalein, RMI
Lanaʻi, HAWAIʻI
Las Vegas, USA
Lihue, HAWAIʻI
Los Angeles, USA
Majuro, MHL
Manila, PHL
Minneapolis/St. Paul, USA
Molokaʻi, HAWAIʻI
Nadi, FJI
Nagoya-Centrair, JPN
Newark, USA
Oakland, USA
Orange County, USA
Osaka-Kansai, JPN
Pago Pago, ASM
Papeete, PYF
Phoenix, USA
Pohnpei, FSM
Portland, USA
Sacramento, USA
Salt Lake City, USA
San Diego, USA
San Francisco, USA
San Jose, USA
Seattle/Tacoma, USA
Seoul-Incheon, KOR
Sydney, AUS
Taipei-Taoyuan, TWN
Tokyo-Haneda, JPN
Tokyo-Narita, JPN
Vancouver, CAN
Victoria, CAN

STAKEHOLDER RESPONSIBILITIES

In this report, each Element is strategically categorized as either DOT-A or Tenant. This categorization reflects the stakeholder responsibilities that define the complex administrative structure of HNL, with the intent to facilitate future collaboration among stakeholders. HNL includes terminals, public spaces, and other areas directly controlled by DOT-A. Tenants include each airline company, maintenance facilities, retail and restaurant concessionaires, cargo facilities, catering companies, ground handling companies, and state and federal administrative agency branches with offices at HNL. While DOT-A does not control all Tenant operations and facilities, as the main leaseholder, DOT-A can significantly influence Tenants through the development of sustainability initiatives and policies. Stakeholder responsibilities for each Element occurs as follows:

CARBON

The Carbon Element provides performance metrics and indicators for greenhouse gas (GHG) emissions at HNL. In this report, GHG emissions—specifically carbon, CO2; methane, CH4; and nitrous oxide N2O—are converted into carbon equivalents (hereinafter referred to as carbon emissions). Carbon emissions are stationary or mobile sources that consume energy from fossil fuel resources. Stationary sources include general facilities. Mobile sources include flight operations (LTO/cruise cycle), ground support equipment (excluding electricity-consuming equipment), and ground access vehicles (passenger vehicles, taxi, and other landside vehicular traffic).

DOT-A baseline reflects estimated carbon emissions by DOT-A owned and/or controlled emission sources. Emissions that are indirectly released by DOT-A but are reflected in the DOT-A baseline include carbon emissions from electricity purchased from HECO for DOT-A consumption and emissions from fuel burned by ground access vehicles.

Tenant baseline reflects estimated carbon emissions by Tenant controlled emission sources, and electricity consumed by the Tenant.

The information presented for the Carbon Element highlights the main components of the HNL carbon system pertaining to existing facilities, aircraft operations, ground operations, ground transportation, and data reporting. Sources of carbon emissions not fully disclosed in the scope of this Element include emissions from airport rescue fire fighting (ARFF) and training exercises, solid waste disposal and recycling, water heaters, and general construction activities. Fire training exercises are not conducted within the HNL boundary, solid waste disposal and recycling are excluded per Airport Cooperative Research Program (ACRP) recommendations. There is insufficient data to calculate construction-related emissions and carbon emissions from electricity consumed by water-heaters are included in the statistics for general electricity consumption.

WATER

The Water Element provides performance metrics and indicators for potable and greywater use at HNL. City and County of Honolulu Board of Water Supply (BWS) and DOT—Highway Division (DOT-H) provide water infrastructure for all water consumption at HNL.

DOT-A baseline reflects estimated water consumption by DOT-A owned and/or controlled water consumption sources. Due to metering limitations in the current water management system, DOT-A baseline statistics at this time may also include water consumption by Tenant owned and/or controlled spaces, facilities and operations.

Tenant baseline reflects estimated water consumption by Tenant controlled water sources that are sub-metered and billed by the DOT-A.

The information presented for the Water Element highlights the main components of the HNL water system pertaining to existing metering and management, greywater and irrigation, water-efficient fixtures, wastewater treatment, stormwater management, and benchmarking and reporting data. Sources of water consumption not fully disclosed in the scope of this Element include any Tenants that have direct contracts with BWS (i.e. larger Tenants with land leases). The volume of wastewater generated, the quantity and quality of stormwater, and data for separating actual water consumption and leaks are also not included in this Element.

WASTE

The Waste Element provides performance metrics and indicators for municipal solid waste (MSW) generation at HNL. Waste streams include pallets, scrap metal, office paper, green waste, newspaper, cardboard, bulky items, street sweepings, and rubbish from everyday airport operations. These wastes come from the main passenger terminals, ancillary operations such as cargo and maintenance hangars, administrative offices, the maintenance baseyard, and aircraft operations.

DOT-A baseline reflects estimated MSW streams managed by DOT-A contracts. These include waste streams generated from DOT-A contracted dumpsters, including waste from public areas. The DOT-A baseline figure may also reflect waste from some Tenant waste disposed in DOT-A dumpsters.

Tenant baseline reflects estimated waste streams privately managed by Tenant contracts.

The information presented in the Waste Element highlights the main components of the HNL waste system pertaining to existing waste generation and management, waste diversion including recycling and composting, public area waste from the passenger terminals, airline deplaned waste, and monitoring and reporting materials flows. Waste streams not fully disclosed in the scope of this Element include construction and demolition waste, hazardous waste, (e.g. electronics, motor oil, batteries, light bulbs, chemicals, and paints), bulky item waste, phone book recycling, and Tenant-managed waste streams.

ENERGY

The Energy Element provides performance metrics and indicators for the electricity used at HNL. Sources of energy consumption include main-terminal spaces (such as terminals and concourses), non-terminal spaces (such as hangers, parking structures, maintenance base yard, and chillers), and airfields.

DOT-A baseline statistics reflect estimated electricity used by DOT-A owned and/or controlled energy consumption sources. DOT-A statistics may reflect energy consumption by the public and some tenants over which the DOT-A has no direct influence.

Tenant baseline statistics reflect estimated electricity used by Tenant controlled energy consumption sources based on DOT-A billing structure. These statistics exclude Tenants who pay electricity directly to HECO.

The information presented in the Energy Element highlights the main components of the HNL energy system pertaining to existing energy management and control structure, sub-metering and reporting, lighting and mechanical equipment retrofits, renewable energy, and benchmarking using the ENERGY STAR® Portfolio Manager. Sources of energy consumption not fully disclosed in the scope of this Element include Tenants on the airport campus with direct contracts with HECO.

PERFORMANCE METRICS, INDICATORS, & METHODS

The performance metrics and indicators of each Element draws from industry-accepted protocols for performance benchmarking and sustainability reporting from the following:

- Global Reporting Initiative (GRI)
- Greenhouse Gas Protocol developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)
- The Climate Registry General Reporting Protocol
- Natural Resource Defense Council (NRDC)
- Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP)
- International Civil Aviation Council (ICAO)
- Airports Council International-North America (ACI-NA)
- Federal Aviation Administration (FAA)

These baselines draw from aviation industry guidance unique to other airport sustainability initiatives. Some of these airports include the Port of Seattle-Tacoma, Denver International Airport, Los Angeles World Airports, Chicago O'Hare International Airport, and San Francisco International Airport.

Data sources for each Element are presented as best estimates and grouped into historic data (pre-2009) and baseyear statistics (2009-2010). Baseline statistics are normalized according to 2009 gross building floor area, passengers, and flight operations to enable cross comparison within and between Elements over time and across other airports.

CARBON

Statistics for carbon emissions are presented in metric tons (mtCO2e). The Carbon Element baseline was created in partnership with the University of Hawai'i Economic Research Organization's (UHERO) Energy and Greenhouse Gas Solutions Program (EGGS). Data statistics for the Carbon Element came from document analysis, face-to-face discussions with key HNL stakeholders, Tenant questionnaire survey, and default emissions factors for various fuel types. Default kWh emissions factors for Hawai'i-specific electrical power plants are used for electricity consumption. The DOT-A Engineering Branch provided data regarding generator types, capacities, yearly run time, fuel types, chiller types, cooling capacities, refrigerant types, and refrigerant capacities. The electrical consumption data came from HECO billing statements and DOT-A electrical vault meters. For aircraft emissions, the Hawai'i Fuel Farm Consortium, O'ahu District Airport Operations Control Unit, FAA, and HNL Ramp Control provided data for uplifted jet fuel, aircraft types, origins of arriving flights, and destinations of departing flights. Department of Business, Economic Development, and Tourism (DBEDT), DOT-A Engineering Branch Planning Section, and the Census 2000 provided data for visitor statistics and local population by geographic area, used to determine ground access vehicle (GAV) emissions based on percent of population within median distances to HNL.

For data pertaining to Tenant owned ground support equipment, a questionnaire was distributed to 45 Tenants via e-mail, with a 76% response rate. The questionnaire was conducted in six sections. Section one queried 2009 annual fuel consumption in gallons or total expenditures. Section two queried historical fuel consumption and electricity data information back to 1990. Section three queried inventories of all equipment, functions, fuel types, fuel capacity, daily hours in operation, and industry average service time. Section four queried ownership, maintenance, and methods of fueling. Section five queried the use of alternative fuel, equipment types, and goals for future use of alternative fuel. Section six queried employee commutes. It was disclosed to questionnaire participants that all data would be proprietary and

aggregated to determine overall Tenant impact, not the impact of an individual Tenant alone.

WATER

Statistics for water were calculated in 1000s gallons. Data statistics for the Water Element baseline came from document analysis and face-to-face discussions with key HNL stakeholders. BWS provided internal data to quantify potable water delivery to HNL. DOT-H provided internal data to quantify greywater delivery to HNL. DOT-A Engineering Branch provided data for total potable and greywater consumed at HNL. Data on total floor area was obtained from DOT-A Property Management Section.

WASTE

Statistics for waste disposal are calculated in short tons (2000 lbs.). Data statistics for the Waste Element baseline came from document analysis, face-to-face discussions with key HNL stakeholders, the 2009 HNL Waste Assessment Survey, and a comprehensive waste audit. Data was provided by the previous waste hauler. General information regarding Tenant controlled MSW was derived from the 2009 HNL Waste Assessment Survey. The Airport Duty Manager provided data regarding records from contracted disposal of pallets. DOT-A Engineering Branch provided records for office paper, newspaper, cardboard, and scrap metal recycling for the year 2009. The current waste hauler provided data regarding the recycling of DOT-A green waste. For the total estimated MSW from the DOT-A contracted dumpsters and the compositions of waste streams in public areas, a comprehensive waste audit (tonnage study and public area waste characterization study) were conducted on DOT-A Planning Section's Airport Design Day, on August 20th 2010.

The tonnage study focused on the total weight of waste disposed from DOT-A contracted dumpsters. The study was conducted in cooperation with DOT-A's current waste hauler, who modified the routine hauling route and schedule so MSW disposal could be isolated from outside waste contracts. The weight of isolated DOT-A waste was determined at the H-POWER Plant in Campbell Industrial Park and reported via disposal ticket.

The public area waste study focused on the characterization of waste composition and bin utilization of select public terminal areas—baggage claim, ticket lobby, main lobby, central concourse—during 12:30 pm–1:30 pm. The study engaged a group of volunteers and DOT-A Custodial Unit. Each bin was tagged for identification, emptied, and sorted into two groups. The first group was a 10 percent visual sample of the total sort, broken down into a detailed composition (e.g. newspaper, mixed-paper, single-use food ware), while the second group was broken down into a general composition (e.g. MSW, HI-5, liquid). The bin utilization ratios were determined by the number of garbage bags changed divided by the number trash bins observed.

ENERGY

Statistics are calculated in kilowatt hours (kWh). Where appropriate, data is normalized by 2009 floor area and passenger counts. DOT-A Engineering Branch provided data on total kWh consumption according to vaults located throughout various locations at the airport. Baseyear data came from document analysis, face-to-face discussions with key HNL stakeholders, HECO billing statements, and DOT-A electrical vault meters. Data on total floor area was obtained from DOT-A Property Management Section.

HNLcarbon

2009 - 2010
BASELINE

Airport-Wide Carbon Emissions

6,480,536 mtCO2e

1.12 Metric Tons CO2e/Square Foot
0.36 Metric Tons CO2e/Passenger
25.06 Metric Tons CO2e/Flight Operation

Tenant Performance

98.70%

of HNL total

6,396,288 mtCO2e

DOT-A Performance

1.30%

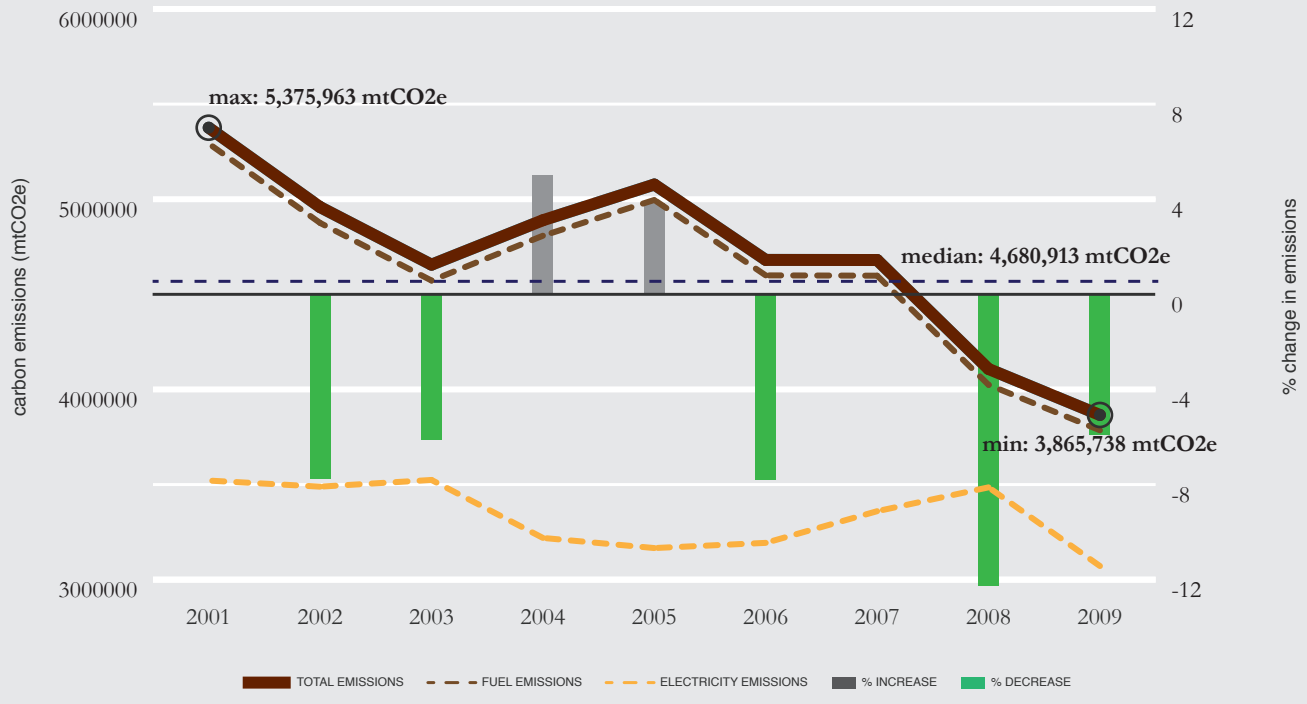
of HNL total

84,248 mtCO2e

SYSTEM OVERVIEW

PRE-BASELINE PERFORMANCE (2001-2009)

Historical data for carbon emissions from aircraft uplifted fuel and electricity consumption between 2001-2009 suggests a 28% decrease in carbon emissions airport-wide (5,375,963 mtCO2e in 2001 to 3,865,738 mtCO2e in 2009). The data indicates a stronger correlation between carbon emissions and uplifted fuel consumption compared to electricity consumption.



Annual Emissions, Pre-Baseline 2001-2009

This graph illustrates historical carbon emissions by aircraft fuel and electricity consumption (left axis), with percent change year-to-year of total emissions (right axis).
**source: DOT-A*

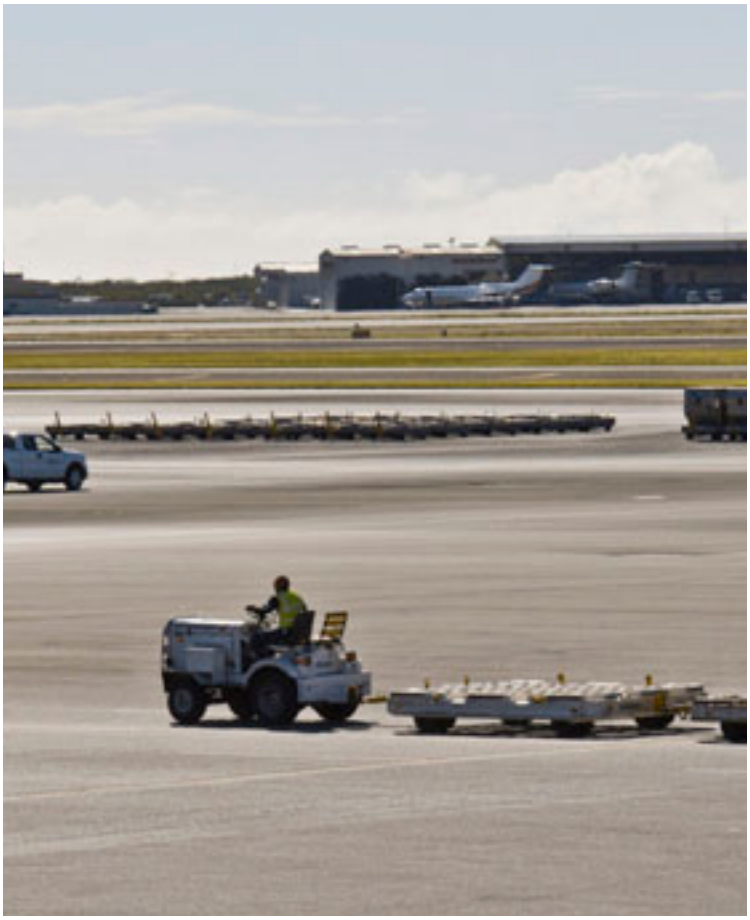
FACILITIES (STATIONARY SOURCES)

Approximately 1.25% (80,967 mtCO2e) of total HNL carbon emissions are released from general facilities. The remaining 98.75% (6,399,569 mtCO2e) released from mobile sources. General facilities at HNL include the overall electricity purchased from HECO—for which Tenants and DOT-A are both indirectly responsible—as well as the emergency power generators and unintentional gas leaks/fugitive refrigerant gas from HVAC equipment for which DOT-A is directly responsible. Currently, water heaters, 400Hz ground power, and other electricity-based ground support equipment powered by electricity are included in the total consumption by general facilities.

Emissions from emergency power generators—which generate back-up power from low sulfur diesel fuel—typically occur during a routine monthly testing. Unintentional fugitive refrigerant gas leaks result from the processing, transmission, and storage of fossil fuels, CFCs, and sulfur hexafluoride (SF6) from fuel distribution. These leaks typically occur at joints, seals, packaging, and gaskets and exclude any intentional gas emissions, such as those from exhaust pipes, chimneys, and vents. The main source of gas leaks at HNL originates at the central chiller plants that provide air-conditioning to all terminal buildings. General facilities account for approximately 0.24% (15,575 mtCO2e) of Tenant emissions and 77.04% (64,930 mtCO2e) of DOT-A emissions.

GROUND SUPPORT EQUIPMENT

Ground support equipment (GSE) are considered off-road vehicles that do not leave the airfield, such as equipment for aircraft support (e.g. aircraft tugs, loaders, tractors, ground power units (GPU)), facilities and maintenance (e.g. sweepers, vacuums, trailers), and airside transportation (e.g. shuttles, carts, miscellaneous automobiles). GSE consuming gasoline, diesel, or propane accounts for approximately 0.09% (5,458 mtCO2e) of total Tenant emissions. GSE account for approximately 0.80% (674 mtCO2e) of total DOT-A emissions.

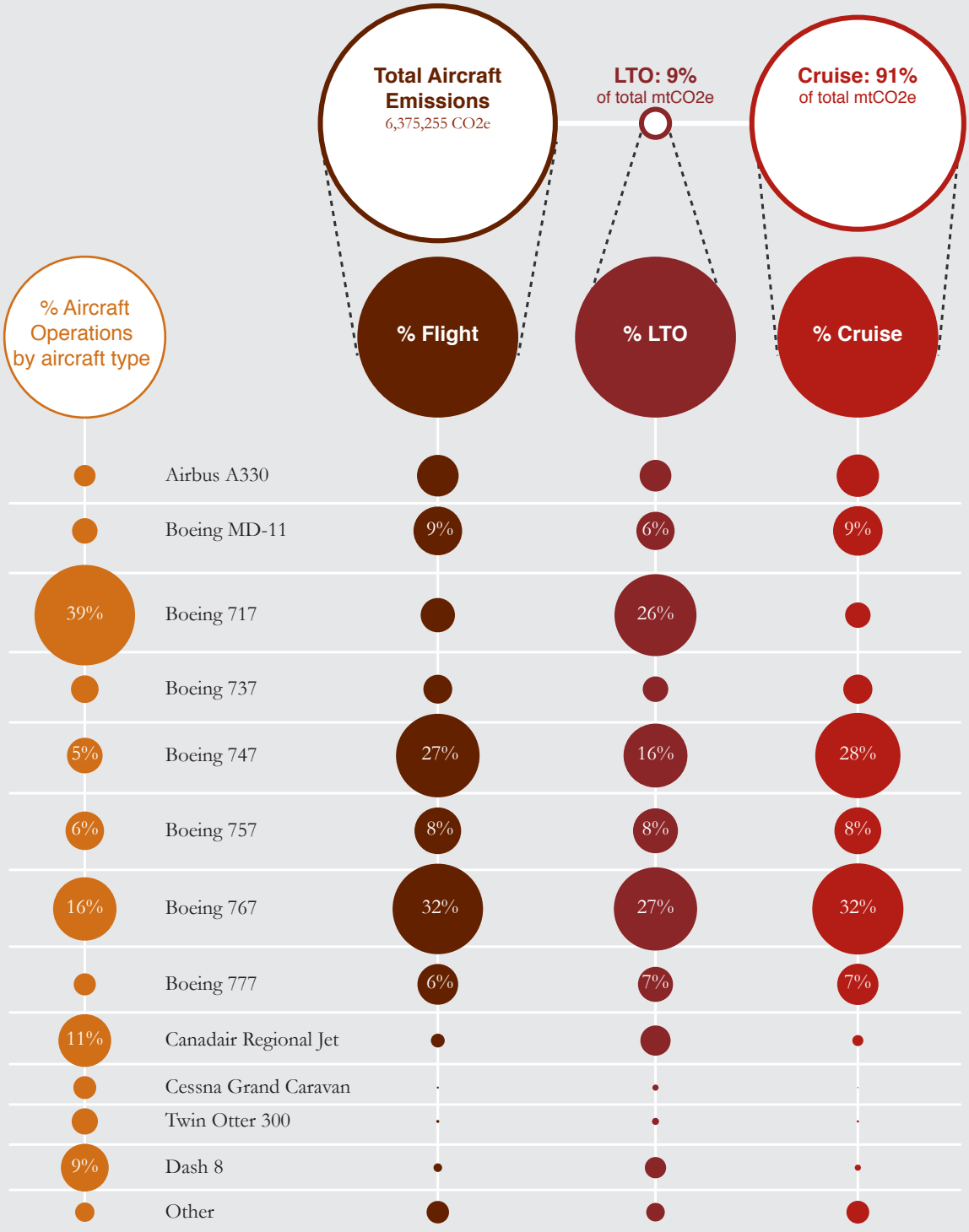


According to the GSE survey,some Tenants are currently using fuel-efficient and electric vehicles and have expressed interest in expanding such initiatives. In compliance with Act 96, DOT-A has proactively replaced the majority of its GSE fleet with low-emitting, fuel-efficient vehicles. To further reduce emissions from GSE, HNL increasingly provides both hydrant fueling at certain airport gates to reduce/eliminate the emissions of fueling tanker truck operations on the ramp, as well as 400Hz ground power to minimize the consumption of diesel from GPU and jet fuel from aircraft Auxiliary Power Units (APU).

AIRCRAFT OPERATIONS

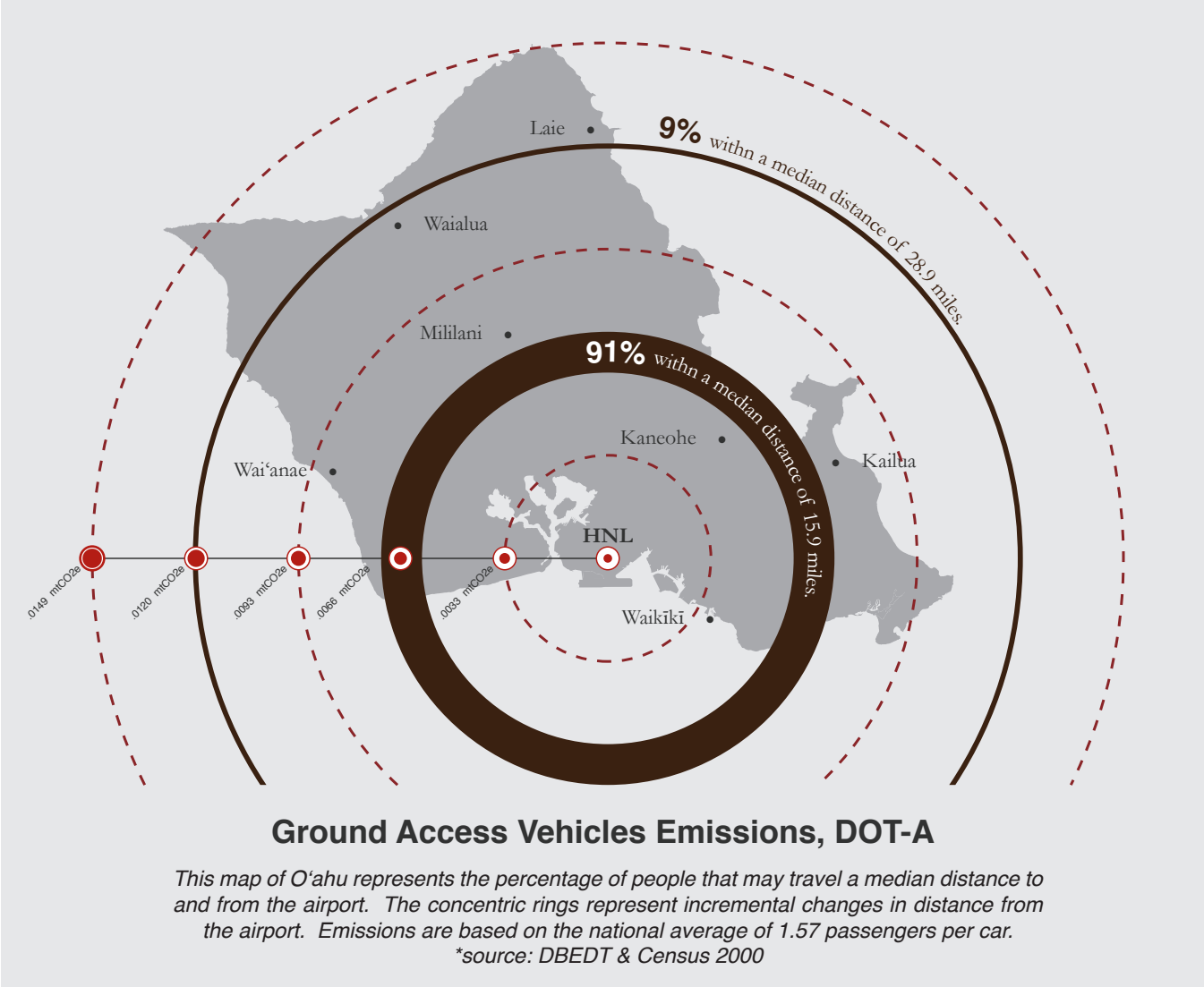
Tenants are directly responsible for emissions generated by aircraft operations. Aircraft operations generate approximately 99.67% (6,375,255 CO2e) of Tenant emissions, which are significant due to the amount of jet fuel consumed during the landing-takeoff and departure cruise cycles. The landing-takeoff cycle (LTO) is the full process of an aircraft landing (approach) and taking-off (climb-out), which includes taxi idling upon arriving and departing. The departure cruise cycle is the full process of aircraft travel between airports, in which the aircraft enters the cruise phase of flight between ascents from and descents to 3,000 ft (914 m). This is the most fuel-efficient time of an aircraft's operations, however, it consumes the majority of fuel due to the duration of flight. Overall, aircraft operations and aircraft emissions are indirectly related, since the percent total of aircraft emissions is dependent on the efficiency of LTO and cruise cycles rather than total aircraft operations of each aircraft type.

All aircraft at HNL consume jet fuel, which supports both the aircraft's main engines during flight and the APUs during taxiing. When an aircraft is at the gate, the power from main engines are replaced by the APU, which powers aircraft electronic systems, air pressure, and air conditioning during pre-flight checks. Through high-performance design considerations, HNL has become one in four airports nationally to implement a design and construction guideline to capture the synergy between operational efficiency and reduced carbon emissions. Such considerations include: coordinating the planning of airside facilities to reduce taxi distances and times, and ensuring infrastructure at terminal gates to support the use of 400Hz ground power and PC-Air for aircraft (opposed to running the APU or GPU). Such efforts are in direct alignment with the ACI-NA goal for member airports to have at least 25% of their loading bridges equipped with PC-Air and 400Hz by 2019.



Aircraft Operations Emissions, Tenant

This graph illustrates carbon emissions per aircraft type, according to the percentage of total aircraft, total LTO, and total cruise emissions. Emissions per aircraft are compared to the percentage of total operations (left column).
**source: DOT-A*



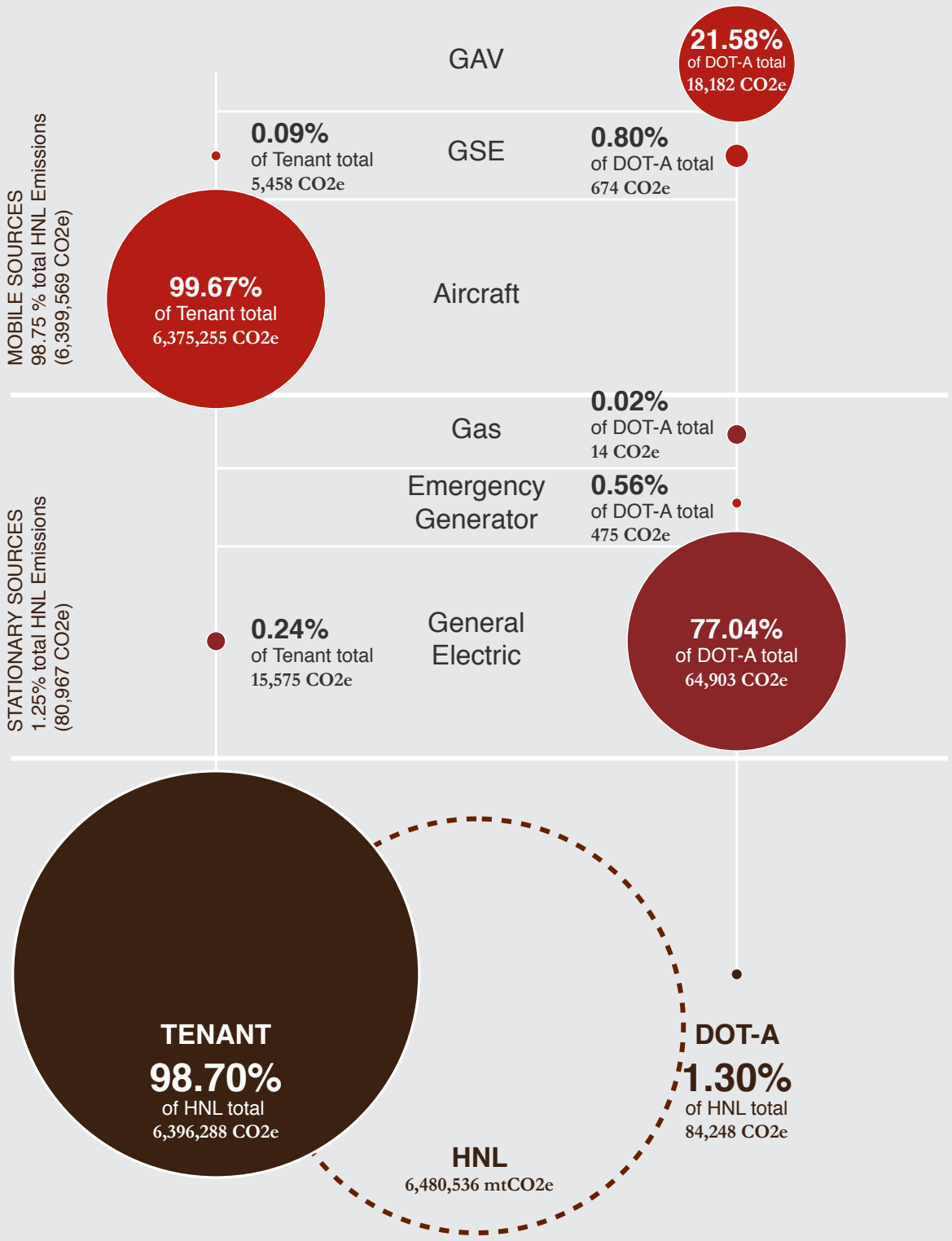
Ground Access Vehicles Emissions, DOT-A

This map of O'ahu represents the percentage of people that may travel a median distance to and from the airport. The concentric rings represent incremental changes in distance from the airport. Emissions are based on the national average of 1.57 passengers per car.
**source: DBEDT & Census 2000*

GROUND ACCESS VEHICLES

Ground Access Vehicles (GAV) typically include public passenger and employee vehicles, taxis, rental car shuttles, and other forms of fossil-fuel based transportation that travel between HNL and the rest of O'ahu. DOT-A is indirectly responsible for GAV emissions, which accounts for approximately 21.58% (18,182 mtCO2e) of DOT-A emissions, although this emissions source only accounts for 0.3% of total HNL emissions. Approximately 91% of GAV travel a median distance of 15.9 miles, with the remaining 9% traveling a median distance of 28.9 miles

To mitigate emissions from GAV, the DOT-A has taken a variety of measures. Cell Phone Lots have been designated so drivers may wait in their vehicles, rather than circling the terminal. Pedestrian crossings and footpaths between terminals, taxi pick up and drop locations, and bicycle racks are available to provide safe access to public transportation alternatives. An Automated Vehicle Identification system (AVI)—a GPS tracking system that monitors and records vehicular traffic flows at the airport—was implemented to track the activity and resultant emissions of registered vehicles that serve business purposes at HNL (e.g. ground transportation service, merchandise delivery, taxis, meters and greeters etc.). To further reduce emissions from rental car shuttles, DOT-A is currently developing a consolidated rental car facility (ConRAC), which will place all rental car companies in one location linked to the terminals via a fuel-efficient common shuttle bus system.



Total Carbon Emissions, Tenant / DOT-A

This diagram illustrates both the percentage of total HNL emissions by the Tenant and DOT-A (bottom two bubbles), as well as the percentage of emissions per Tenant/DOT-A according to the emission source category.
**source: DOT-A*

HNLwater

2009 - 2010
BASELINE

Airport-Wide Water Use

474,485,000 Gallons

82.04 Gallons/Square Foot
26.12 Gallons/Passenger
1,834.75 Gallons/Flight Operation

Tenant Performance

24.18%
of HNL total

114,707,000 Gallons

DOT-A Performance

75.82%
of HNL total

359,778,000 Gallons

Greywater Use

17.22%
of DOT-A Total

61,967,000 Gallons

SYSTEM OVERVIEW

PRE-BASELINE PERFORMANCE (1998-2009)

Historical data for potable water use between 1998-2009 suggests a 16% increase in consumption from 354,507,000 gallons in 1998 to 412,518,000 gallons in 2009, with consumption peaking at 481,797,000 gallons in 2000. Although there was an overall increase since 1998, consumption since 2000 has decreased 14%. Data for greywater shows an average of 18,969,000 gallons. used between 1998-2009, with a low in 2007 (1,868,000 gal.), a high in 2009 (61,967,000 gal.), and close to median consumption in 2000 (12,801,000 gal.) and 2004 (19,774,000 gal.). High volumes of greywater may result in part from leaks.

Annual Water Use, Pre-Baseline 1998-2009

This graph illustrates historical water use (left axis), with percent change year-to-year of total water use (right axis).
**source: DOT-A*

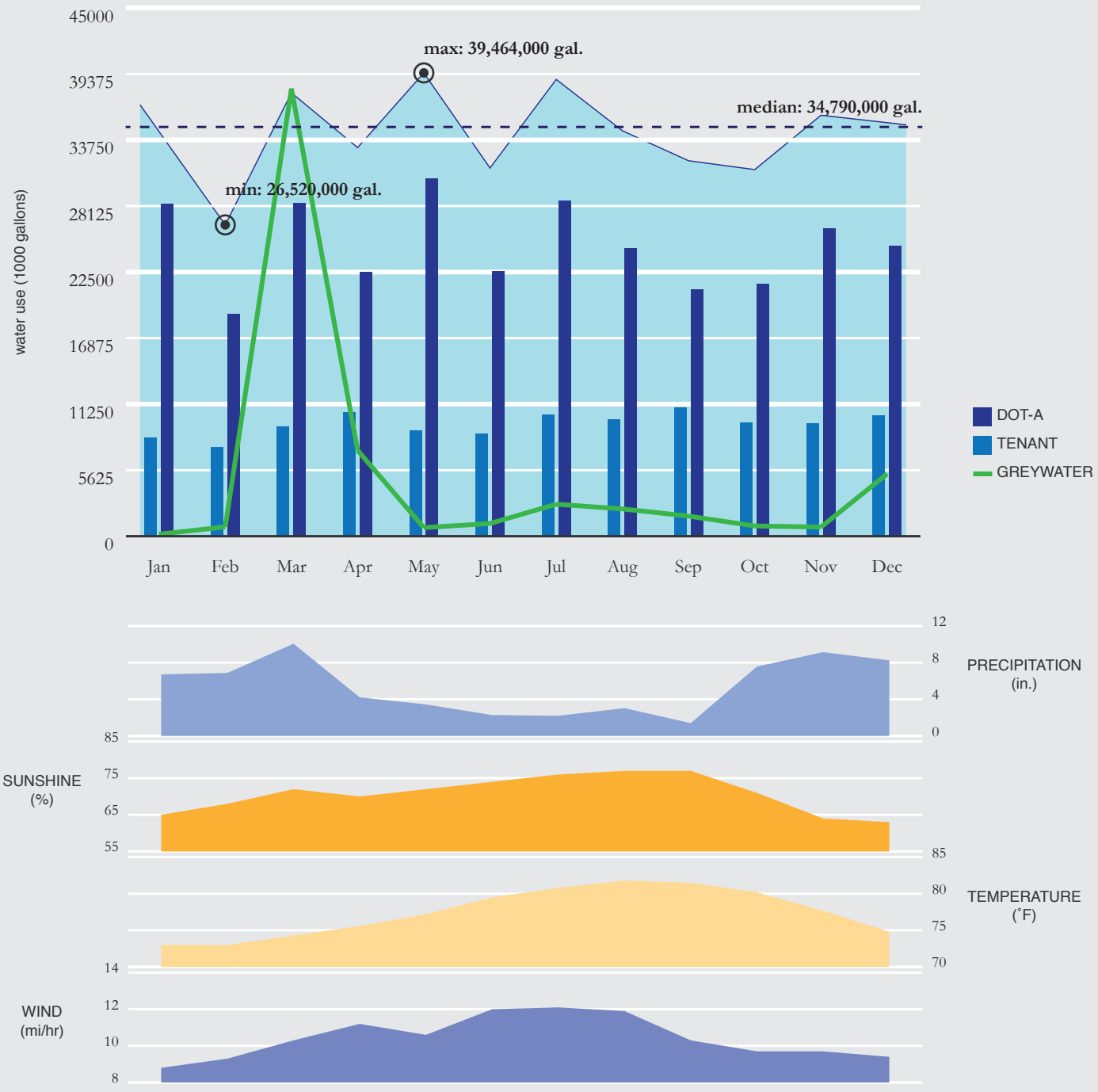
METERING AND MANAGEMENT

Water consumption occurs by ways of facilities, plumbing fixtures, plane washing, irrigation, chillers, wash pads, taxi staging areas, and other miscellaneous uses. Consumption measured through a variety of meters and sub-meters. BWS meters and HNL internal master meters are generally used to monitor overall consumption while sub-meters at HNL are used to detect leaks and monitor Tenant consumption. Tenant sub-meters are primarily for billing purposes, not for general water management and tracking efficiency. Only a select group of Tenants are sub-metered, in which case, BWS directly bills them for water. For tenants without sub-meters, DOT-A charges a standardized fixed rate based on occupied floor area. During facility walkthroughs, HNL staff manually reads and documents these water meters.

For wastewater, existing meters only measure water inputs into HNL. The outputs of wastewater (excluding stormwater) are not metered. Therefore, wastewater outputs are charged according to the volume of potable water consumed by HNL coming from BWS, rather than the actual amount that is returned to the BWS system.

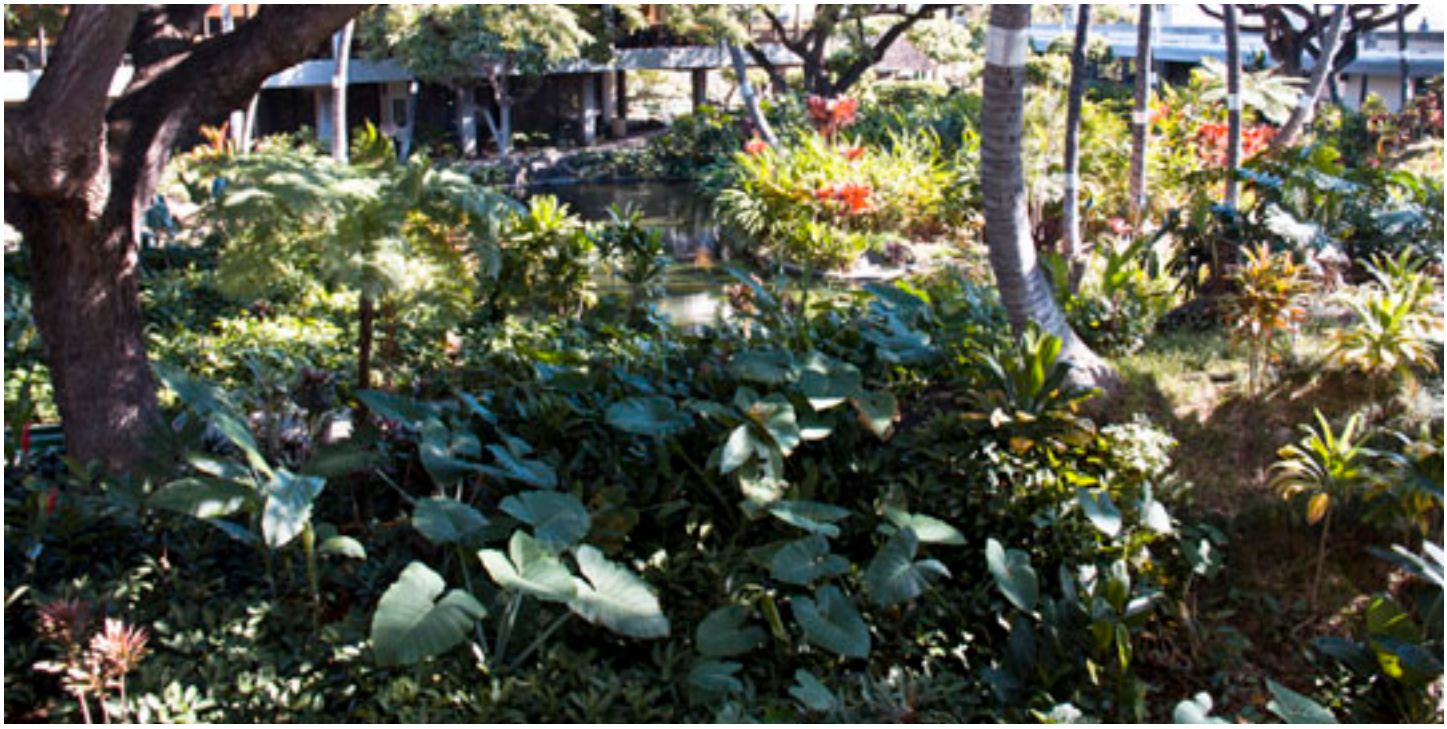
HNL is currently without an automated management and control system to remotely track water performance at a detailed level. As a result, DOT-A cannot fully distinguish between DOT-A and Tenant water consumption. Therefore, DOT-A is unable to systematically identify causes of fluctuations in overall water consumption at HNL. This results in gaps of detailed information DOT-A needs to make systems-wide improvements toward a more water-efficient and economically viable water system. Such challenges are typical of an organization beginning the process of incorporating sustainability into their organizational fabrics. In response, HNL has already begun the process of drafting an HNL Water Policy to promote water conservation and efficiency, in alignment with the ACI-NA goal for member airports to create and implement a Water Conservation and Management Plan and Policy by 2014.

For the baseline, Tenants account for approximately 24.18% (114,707,000 gal.) of water use, while the DOT-A accounts for the remaining 75.82% (359,778,000 gal.). Median consumption measured at 34,790,000 gallons, with a low of 26,520,000 gallons in February and a high of 39,464,000 gallons in May.



Monthly Water Use, Tenant / DOT-A

The top graph illustrates the month-to-month use of potable water and greywater in 2009. The bottom graphs depict corresponding weather data that may or may not have a direct influence on water consumption throughout the year.
**source: DOT-A & DBEDT*



GREYWATER & IRRIGATION

HNL conserves potable water using greywater from DOT-H infrastructure to irrigate landscaping. Greywater accounts for approximately 17% (61,967,000 gal.) of DOT-A water consumption. Abnormal spikes in greywater consumption may result from leaks in the irrigation infrastructure. HNL maintains the ability to temporarily supply irrigation needs with potable water if greywater supply is disrupted, although supply is not always predictable. Based on the success of this endeavor, DOT-A is continually looking for more opportunities to increase greywater use at HNL; there is currently no greywater recaptured internally from DOT-A or Tenant water consumption.

WATER-EFFICIENT FIXTURES

Additional water savings have been achieved through the installation of a variety of water-efficient fixtures, including low-flow and motion-sensor activated fixtures in restrooms. Despite the good intentions behind the installation of low-flow urinals, these have proven inappropriate for an airport facility, since low-flow urinals cannot withstand the high volume of people that use the restroom each day. The high volume caused the crystallization of pipes behind the urinals, leading to invasive repairs. Although this water-efficiency measure was not as successful as desired, a major lesson was learned, and expanding the knowledge within the industry. Potentially, improved low-flow urinals or more appropriate water-efficiency fixtures may be designed to specifically accommodate the high volume of building users typical of an airport now that the need has been defined. HNL is currently exploring alternative water-efficiency measures for restrooms and public spaces. Reducing the amount of potable water consumed and wastewater generated through low-flow fixtures can reduce costs through reduced uses of BWS services.

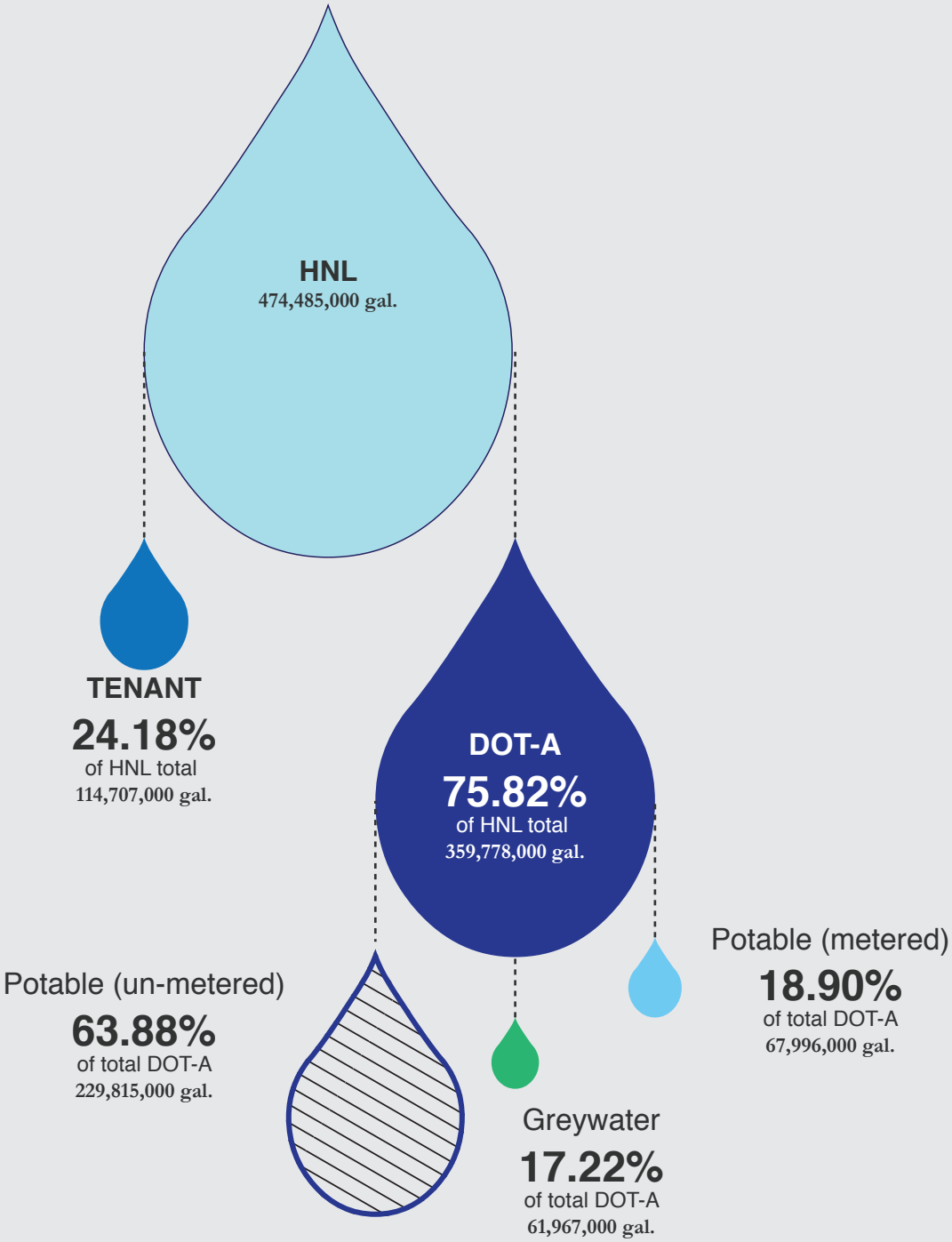
STORMWATER MANAGEMENT

A major component of the HNL water system is the Stormwater Management Program Plan (SWMPP), designed to minimize the discharge of stormwater and pollutants from the HNL campus while ensuring compliance with state and federal regulations. The SWMPP is important to keep the runways, taxiways, and roadways well drained, while caring for surrounding coastal environment and coastal waters.

The SWMPP encompasses a variety of initiatives and programs including the following:

- Coordination of all current permits required under the National Pollution Discharge Elimination System (NPDES)
- Construction Site Runoff Control Program
- Debris Control Program
- Chemical Applications BMP Program
- Industrial & Commercial Activities Discharge Management Program
- Hydrocarbon Removal and Remediation Plan

These are particularly important to reduce the discharge of pollutants from all industrial and commercial facilities and activities, address the potential pollutants from construction activities, reduce pollution from herbicides and pesticides, and prevent the accumulation of litter, debris, sediment, metals, and other pollutants that may enter the HNL sewer system.



Total Water Use, Tenant / DOT-A

This diagram illustrates both the percentage of total HNL water use by the Tenant and DOT-A (top droplets), as well as the percentage of water use per Tenant/DOT-A according to the water consumption source category.
**source: DOT-A*

HNLwaste

2009 - 2010
BASELINE

Airport-Wide Waste Generation

7,000 Tons

2.42 lbs./Square Foot
0.77 lbs./Passenger
1.54 lbs./Passenger Departure
54.14 lbs./Flight Operation

Tenant Performance

55.35%
of HNL total

3,874.33 Tons

DOT-A Performance

44.65%
of HNL total

3,125.67 Tons

Diversion Rate

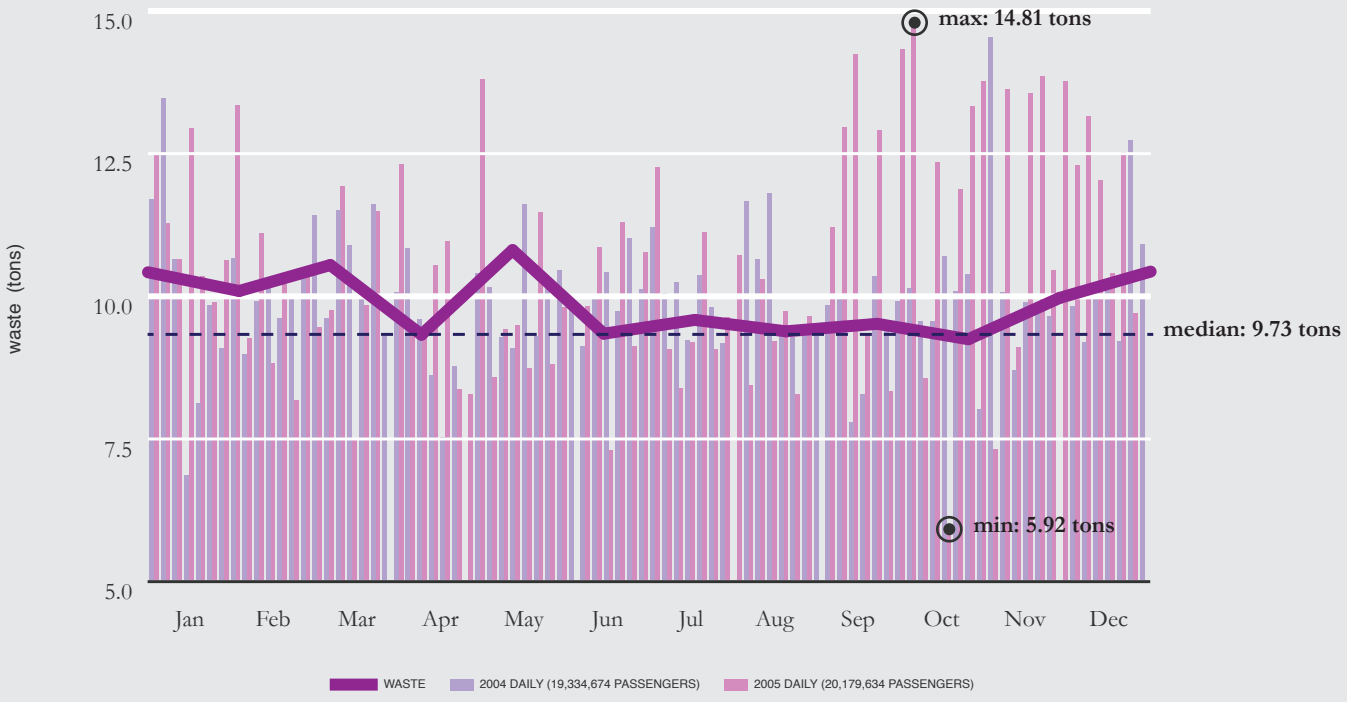
2.65%
of DOT-A total

82.9 Tons

SYSTEM OVERVIEW

PRE-BASELINE PERFORMANCE (2004-2009)

Historical data of dumpster waste suggests an average daily total of 9.89 tons in 2004 (19,334,674 passengers) and 10.60 tons in 2005 (20,179,634 passengers), with a median value of 9.73 tons for both years. The average daily total for 2009 (18,168,746 passenger) was approximately 8.50 tons, a 19.81% decrease in waste generation since 2005.



Average Daily Dumpster Waste, Pre-Baseline 2004-2005

This graph illustrates the historical average daily tonnage from DOT-A managed dumpsters. Data is captured every 10th day and every sunday (bar graph), overlaid by the month-to-month average daily tonnage for 2004-2005 (line graph).
**source: KNG Disposal*

DISPOSAL (INCINERATION/LANDFILL)

Both DOT-A and Tenants individually manage their own waste disposal and recycling contracts—known as a decentralized waste system. For the baseline, HNL generated approximately 7,000 tons of waste, 55.35% (3,874.33 tons) of which were managed by the Tenants, with the DOT-A managing the remaining 44.65% (3,125.67 tons).

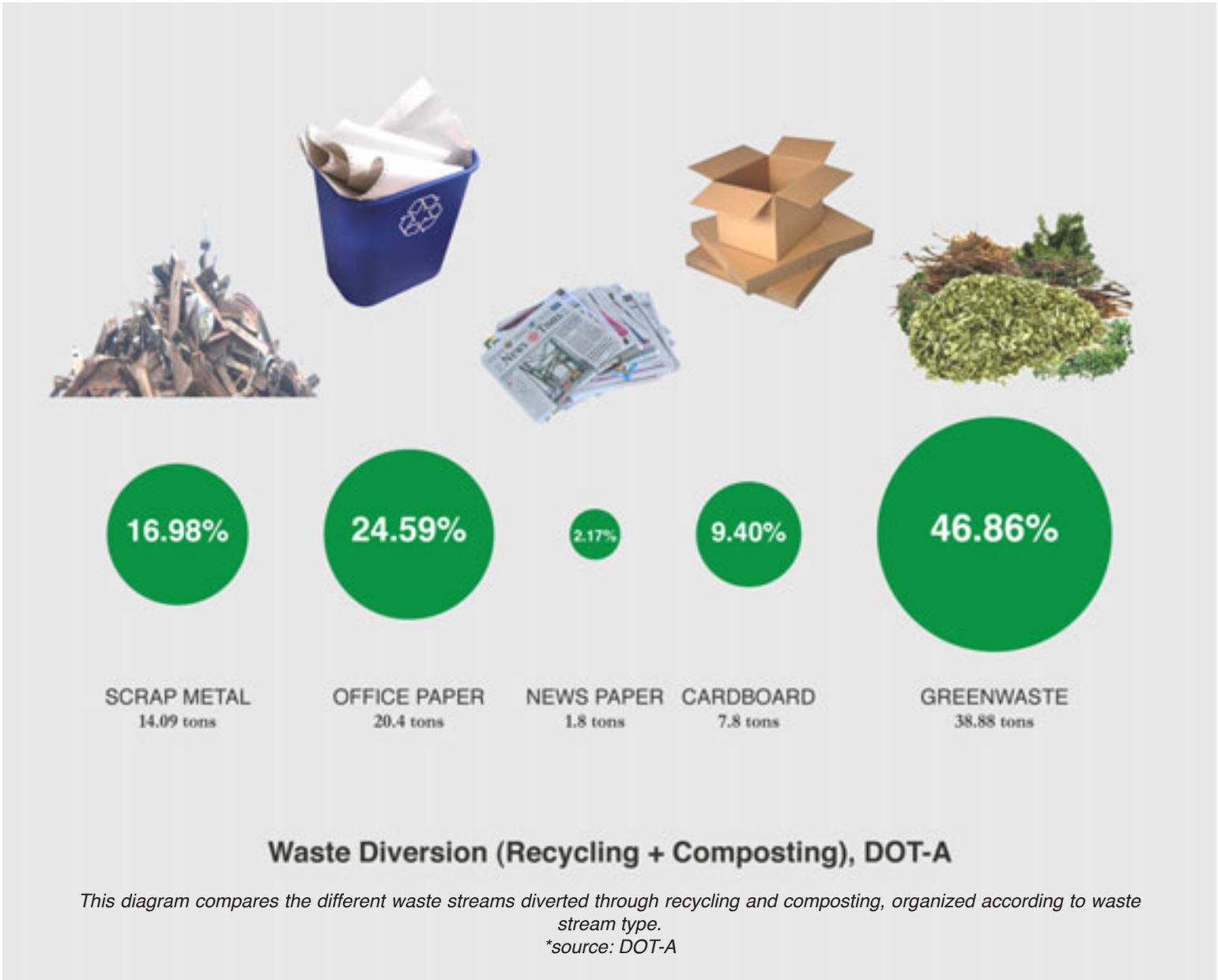
Tenants—such as air carriers, concessionaires, in-flight catering companies, and airline maintenance facilities—generate significant volumes of waste and manage their own private disposal contracts. In some cases, larger Tenants have space for waste disposal infrastructure built into their lease agreements, while smaller operations may have individual dumpsters placed throughout the airport property wherever convenient. Some private dumpsters are located in or underneath the main terminal, but the majority are located along the South Ramp.

DOT-A's primary contract is for disposal of municipal solid waste collected in dumpsters (typically 3-4 cubic yards, open top and front-loading) located throughout the airport property. Dumpster waste represents approximately 95.17% of total DOT-A waste, which is picked up daily and sent to H-POWER for incineration. The majority of DOT-A contracted dumpsters are located near the passenger terminals and along the ramp, with a few additional waste disposal locations for ancillary facilities at the maintenance base yard, the ARFF, and selected T-Hangars for Tenants along the South Ramp.

Existing dumpsters are front-loading, which creates potential hazards if a dumpster is mistakenly left open; trash may attract birds or blow away from the dumpster, creating sources of foreign object debris (FOD) that may compromise the safety of flight operations on the ramp.

To avoid conflicts with peak airline traffic on the ramp, waste haulers must schedule daily trash pick-up during early-morning hours. Many airports use waste hauling and purchasing records to report materials flows both upstream and downstream, understand overall waste generation, and identify opportunities for waste prevention. While this data may exist at the levels of the waste hauler or purchasing departments, DOT-A does not request consolidated waste or purchasing data. The DOT-A is currently looking into ways to track waste reduction and recycling performance. With the exception of the DOT-A's office and scrap metal recycling program, many waste streams managed by DOT-A either do not have waste records available or data must be requested for each individual waste stream from waste haulers.

In addition to dumpster waste, DOT-A manages the disposal of pallets stored at the maintenance base yard in a pile called the pallet yard. The pallet yard is cleared annually and sent to the landfill. Pallets account for approximately 2.17% of total DOT-A waste by weight. Bulky items not immediately reused, recycled, or donated to charity are stored at the DOT-A maintenance base yard for pick-up by the primary waste hauler as a separate contract.



This diagram compares the different waste streams diverted through recycling and composting, organized according to waste stream type.
**source: DOT-A*

AIRLINE DEPLANED WASTE

Airline garbage generated in-flight is called deplaned waste, which includes food and drink containers, uneaten food from in-flight meals, newspapers, magazines, and mixed paper. According to the Natural Resources Defense Council (NRDC), deplaned waste represents approximately 45 percent of all the waste generated at an airport. During a peak summer month in July 2010, visual observations of the waste volume and contents of DOT-A dumpsters suggest that at least 30% of all DOT-A dumpsters on the ramp contain airline deplaned waste. This waste deposited in DOT-A dumpsters is easily recognizable by HNL custodial staff because it is disposed in clear plastic bags so that the contents of the trash are easy to identify should a passenger lose their personal belongings.

United States Department of Agriculture (USDA) requires that deplaned waste from international flights go to incineration upon arrival as a safeguard against foreign pathogens and pests. Many airlines contract with in-flight catering companies to transport, process, and dispose of deplaned waste. Some catering companies have robust recycling programs to recover the cardboard, glass, paper, and plastic materials from domestic flights at their facilities. Unlike international flights, many arriving domestic flights dump deplaned waste directly into DOT-A dumpsters on the ramp even though the airline tenant has a private waste disposal contracts at their airline support facilities.

DIVERSION (RECYCLING/COMPOSTING)

Both DOT-A and Tenants have established initiatives to divert waste from O'ahu landfills, through composting and recycling.

Tenant recycling initiatives are typically self-directed, some of which have been in place for many years. According to the 2009 Waste Assessment Survey results, approximately 66% of Tenants claim to have some form of recycling, while 52% claim to make a conscious effort to purchase products and supplies containing recycled content. Some food-processing facilities and concessionaires have excellent recycling programs for managing items such as cooking oil, pre-consumer food waste (e.g. kitchen scraps) cardboard, paper, glass, plastic, aluminum bottles, and cans. Local recyclers estimate that HNL Tenants recycle approximately 800 gallons of used cooking oil and 8.5 tons of food waste per month.

DOT-A diverted over 80 tons of waste in the base year, representing a diversion rate of approximately 2.65% for HNL. Of the total waste diverted, items included scrap metal (16.98%, 14.09 tons), office paper (24.59%, 20.4 tons), news paper (2.17%, 1.8 tons), cardboard (9.40%, 7.8 tons) and green waste (46.86%, 38.88 tons). Tenant reporting of recycling will increase this performance indicator.

In 2008, HNL revenues from scrap metal recycling totaled $1,936.55. In 2010, HNL expanded the scrap metal recycling program to terminal Tenants through a successful event called the First Annual Scrap Metal Drive. With a goal to collect just 3,000 pounds of scrap metal, DOT-A collected over 40,000 pounds in just one week. Each of these waste types are typically managed by a separate contract and stored at the maintenance base yard.

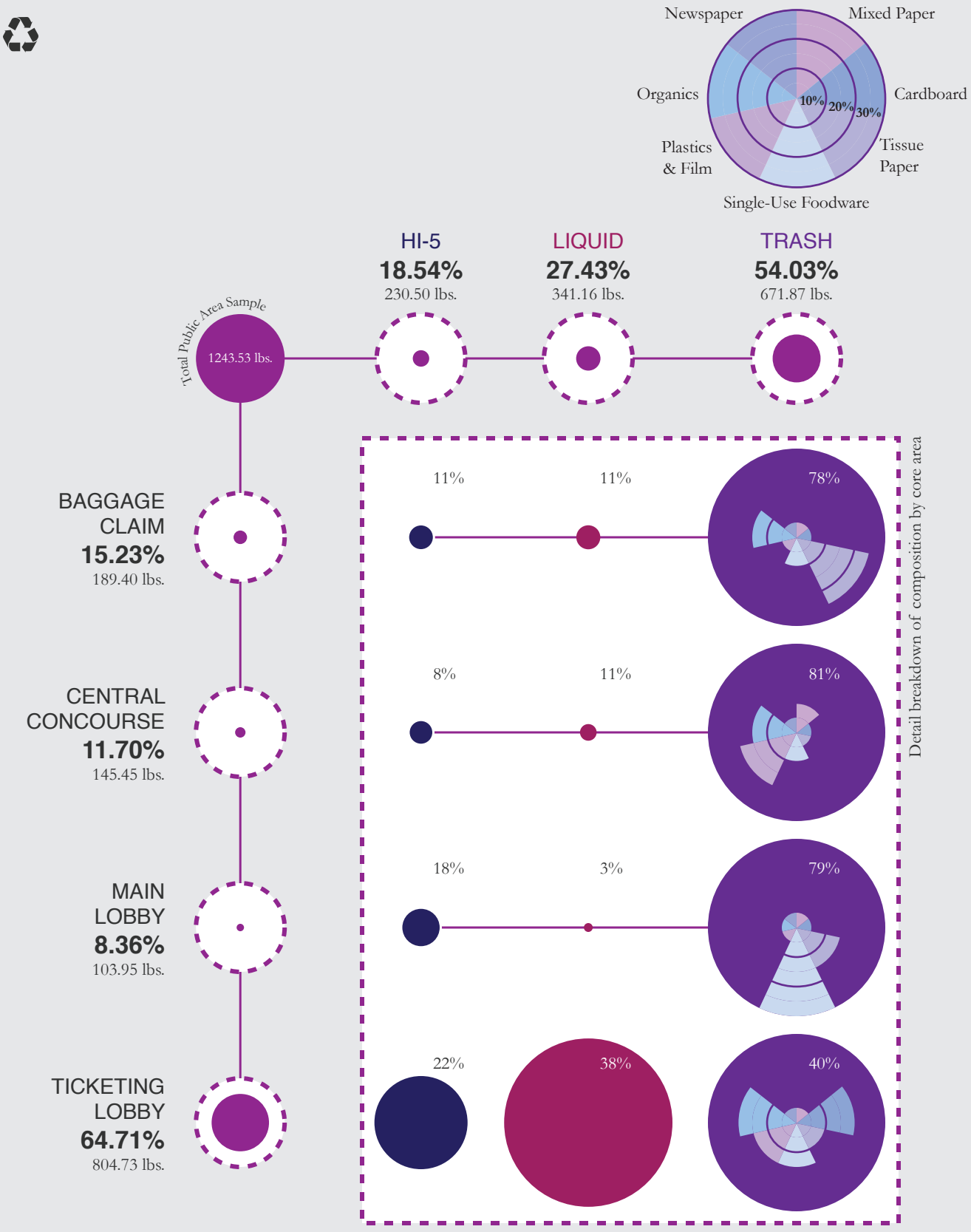
Green waste is stored in 30 cubic yard roll-off containers emptied twice per month for composting. Street sweepings are kept for potential reuse as reef runway and construction infill.

The majority of recycled paper products results from an office-recycling program managed by DOT-A Environmental Section and HNL District Maintenance Division. The program covers cardboard, office paper, and newspaper disposed by DOT-A Division and District administrative offices, which are equipped with central locations for storing recyclables with recycling program signage. A DOT-A recycling crew collects the recycling weekly and brings the materials to the maintenance base yard for staging and later pick-up by a local recycling company. Additionally, DOT-A holds an annual phone book recycling drive for all Tenants.

PUBLIC AREA WASTE COMPOSITION

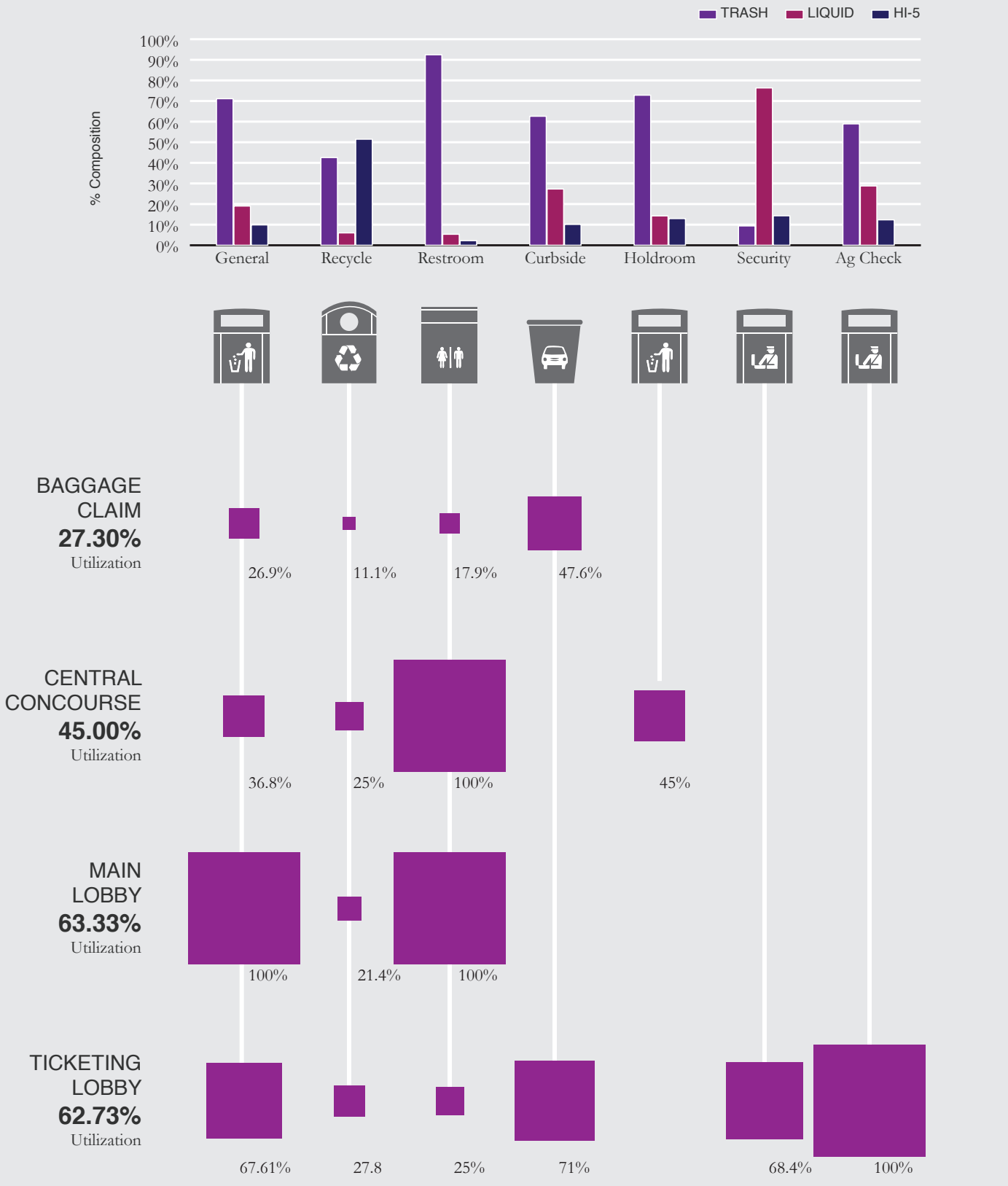
Over 80% of DOT-A dumpsters are located within or directly adjacent to the passenger terminals, half of which contain public passenger terminal waste. Public areas at HNL include spaces such as the baggage claim, ticket lobby, and concourses. Waste generated in this area is referred to as public area waste. The HNL custodial unit empties public area waste bins six times a day. These bins are categorized according to location within the public area, such as security checkpoints, agricultural checkpoints, gate holdrooms, restrooms, terminal curbsides, and HI-5 recycling.

While the total percentage of DOT-A waste generated by public areas is currently unknown, the comprehensive waste audit conducted in August 2010 depicts that public area waste is primarily composed of general MSW (54.03%), HI-5 recyclables (18.54%), and liquids (27.43%). In the public areas, MSW generally contains an assortment of waste, some of which can be recycled. Non-recyclables—including certain plastics, styrofoam, textiles, soiled papers, and other items that could be replaced with biodegradable alternatives—compose roughly 43% of public area MSW. The remaining 57% of the non-recyclable waste included items such as organics (23.59%), single-use foodware (23.49%), tissue paper (19.92%), plastics and film (17.05%), cardboard (10.98%), mixed-paper (4.33%), and newspaper (0.64%). Of the public areas audited, the ticketing lobby generated 64.71%, followed by the baggage claim (15.23%), central concourse (11.70%), and main lobby (8.36%).



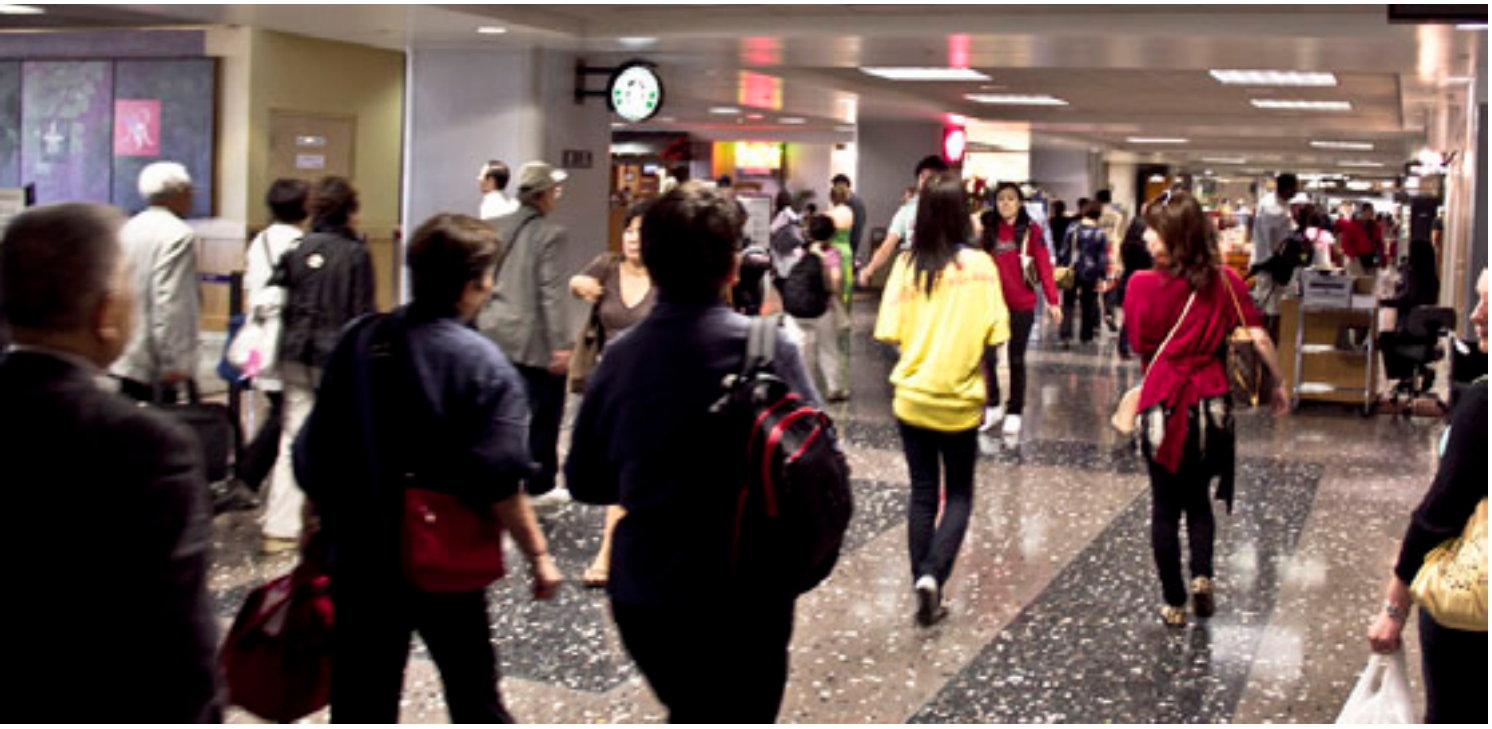
Public Area Waste Characterization, DOT-A

This diagram illustrates the Public Area Waste Characterization Study, organized by core area (left column) and composition (upper row). The detailed composition of trash in each core area is further illustrated (far right box).
**source: DOT-A*



Public Area Waste Bin Utilization, DOT-A

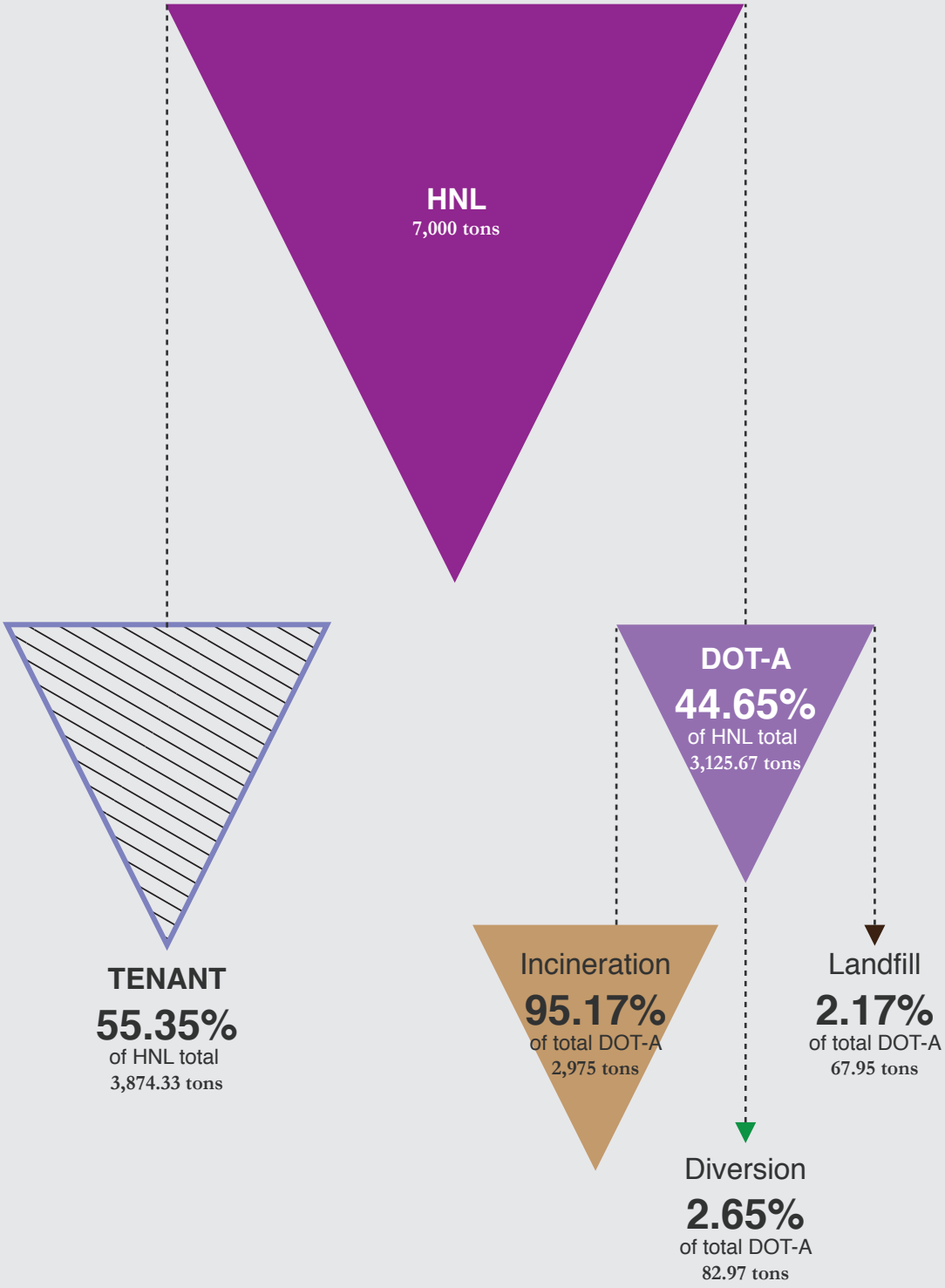
The diagram above illustrates the total bin utilization ration for each core area (left) and for each bin type within the core areas; the bar chart on the top illustrates the percent waste stream composition for trash, liquid, and HI-5 found in each bin type.
**source: DOT-A*



PUBLIC AREA BIN UTILIZATION

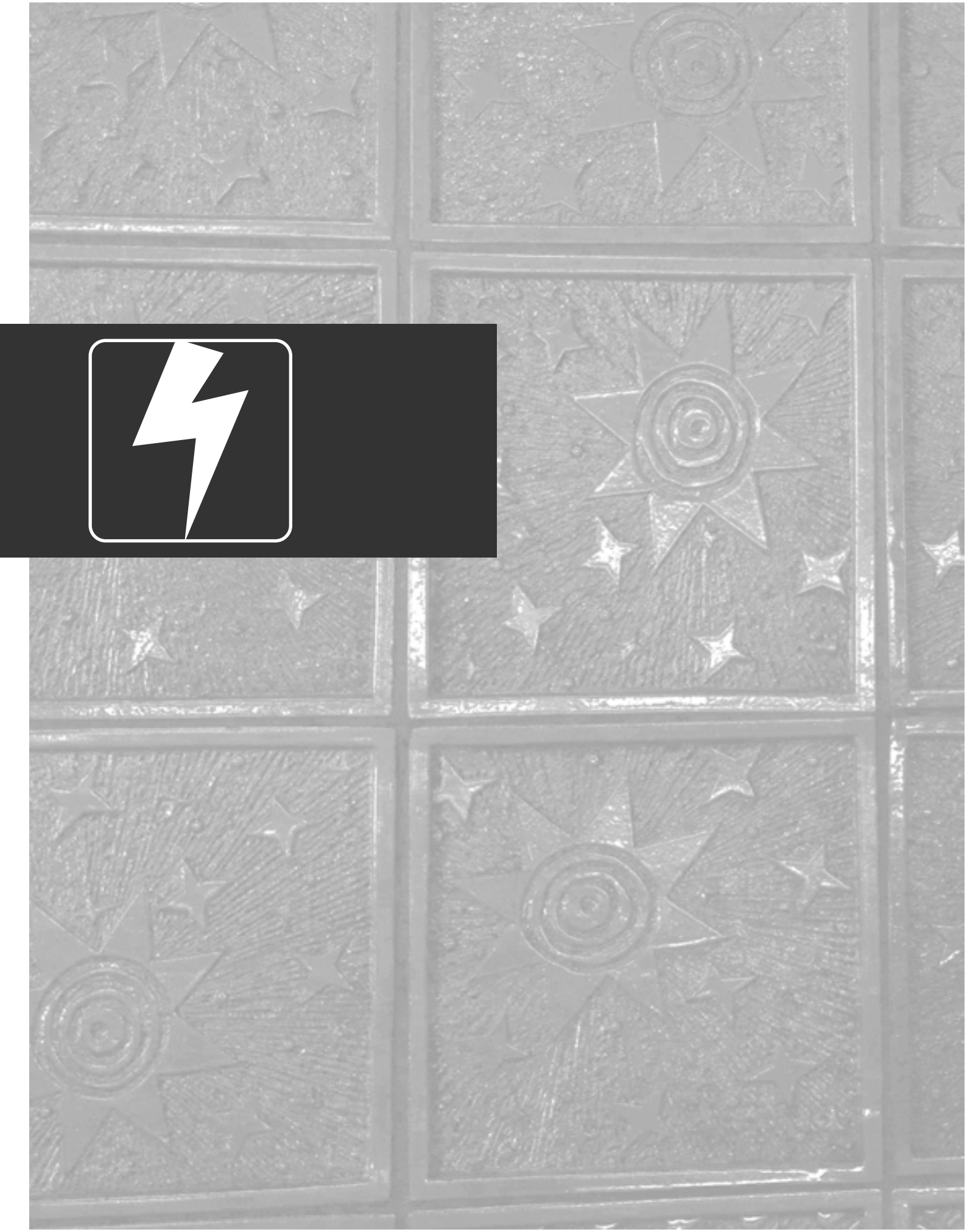
Bin utilization is the ratio of waste receptacles to the amount of waste generated within the same area. Bin utilization is important to determine the appropriate bin capacity for the average volume of waste generated, avoiding excessive emptying of superfluous trash bins.

The ticketing lobby had the highest bin utilization rate, with 62.73% of bins filled, followed by the main lobby (63.33%), central concourse (45.00%), and baggage claim (27.30%). General trash bins were the most utilized (47.27%), followed by bins located near security (22.14%), curbside (12.25%), restrooms (8.85%), holdrooms (6.07%), recycling (1.97%), and agriculture check (1.44%). Although HNL has HI-5 beverage container recycling bins dispersed throughout the public terminal areas, there is no recycling contract to support this program; in many cases, the bottles and cans become mixed back into the regular DOT-A MSW stream. This creates a potential hazard when capped beverage containers are compacted in the refuse trucks or leak during transfer.



Total Waste Generation (Disposal + Diversion), Tenant / DOT-A

This diagram illustrates total HNL waste generation by Tenant and DOT-A responsibilities. Also included are the percentage of waste generated DOT-A according to the waste steam category.
**source: DOT-A*



HNLenergy

2009 - 2010
BASELINE

Airport-Wide Energy Use

97,390,841 kWh

16.84 kWh/Square Foot
5.36 kWh/Passenger
376.59 kWh/Flight Operations

Tenant Performance

19.35%

of HNL Total

18,848,025 kWh

DOT-A Performance

80.65%

of HNL Total

78,542,816 kWh

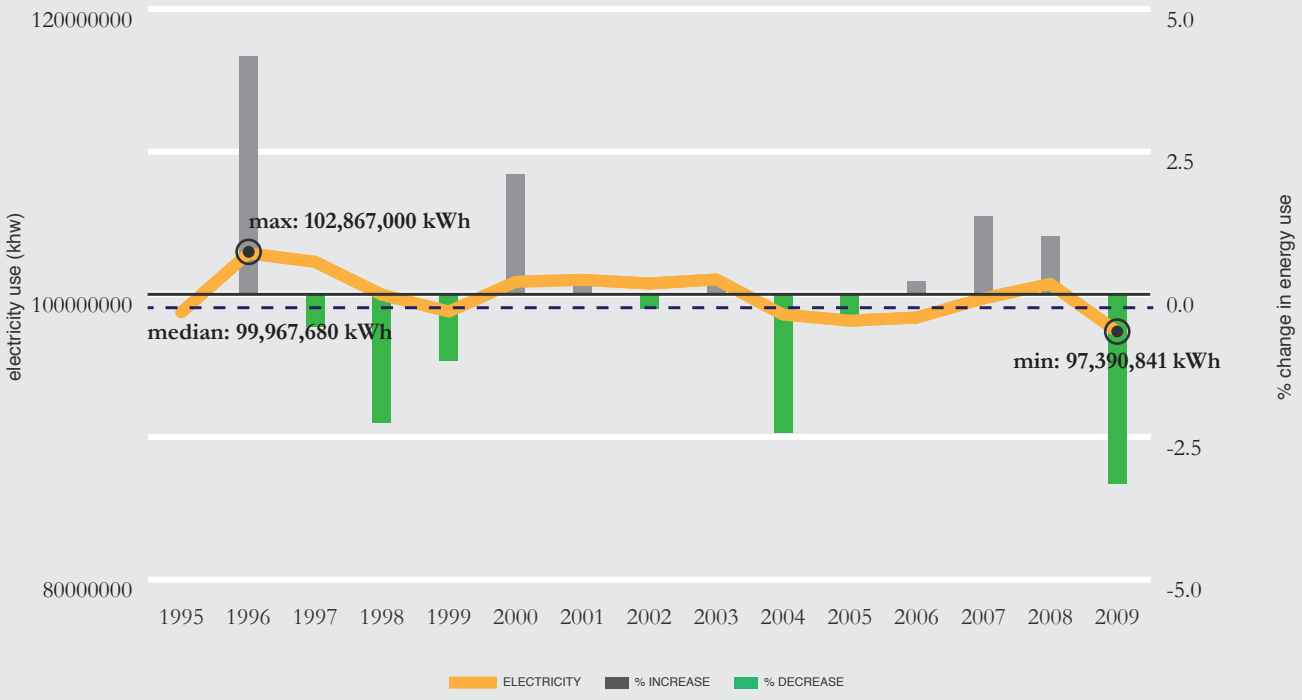
Renewable Energy Installed (Pilot)

16 kWh

SYSTEM OVERVIEW

PRE-BASELINE PERFORMANCE (1995-2009)

Historical data for energy use between 1995-2009 suggests a 1.37% decrease in consumption from 98,746,960 kWh in 1995 to 97,390,841 kWh in 2009, with consumption peaking in 1996 at 102,867,000 kWh.



Annual Electricity Use, Pre-Baseline 1995-2009

This graph illustrates historical electricity use (left axis), with percent change year-to-year of total electricity use (right axis).
**source: DOT-A*

MANAGEMENT AND CONTROL

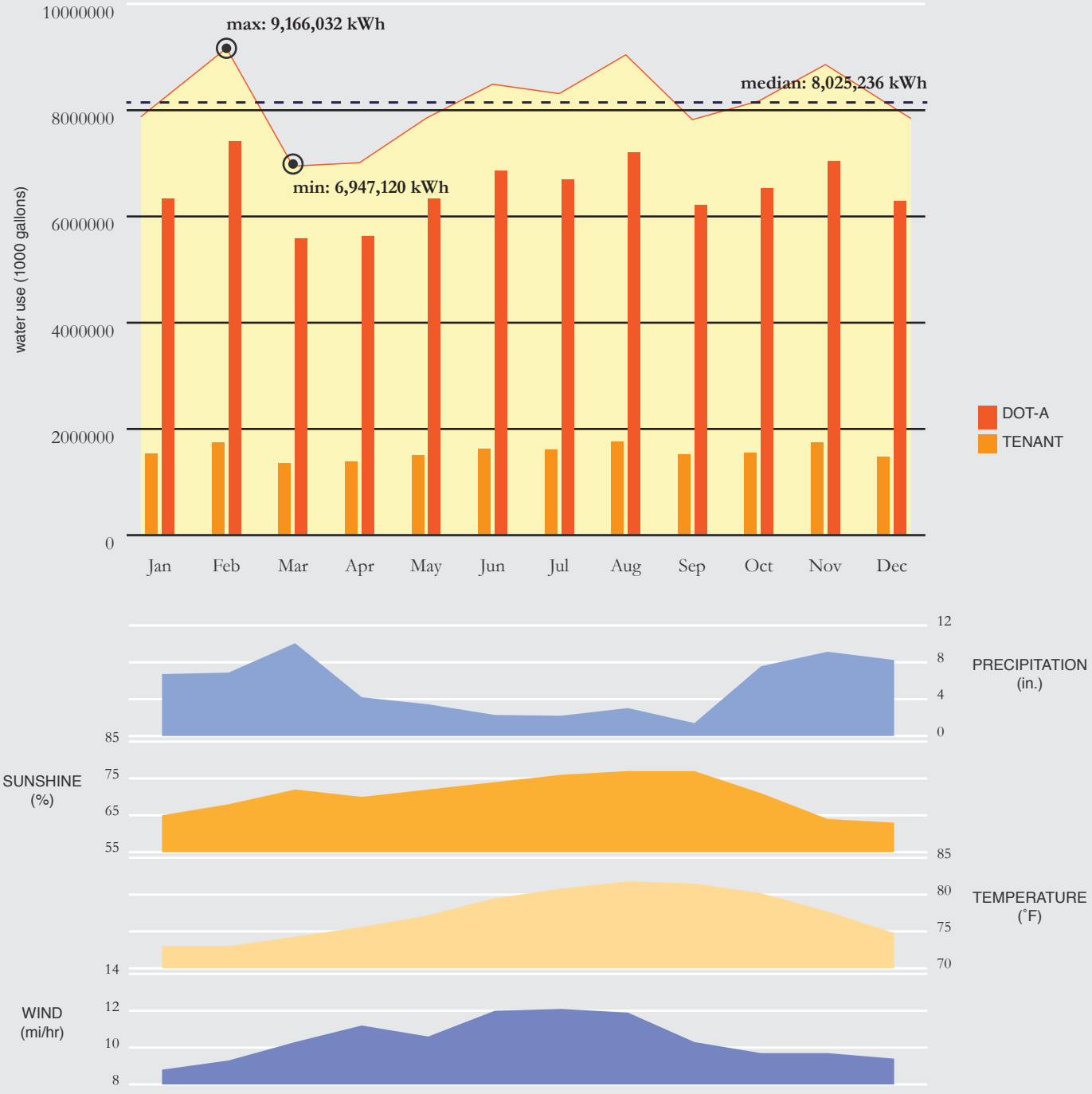
An energy management and control system (EMCS) is a computer-aided tool designed to routinely monitor, control, and optimize energy performance, so that energy-saving opportunities may be implemented and their progress recorded. In 1987, an EMCS was installed to manage and track electricity consumption from airport facility operations. This was followed by the 1991 installation of sub-metering infrastructure to track individual electricity of DOT-A and Tenant spaces, as well as monitor and control interface known as Supervisory Control and Data Acquisition (SCADA) for electrical switches to run lighting and cooling equipment shutdowns in underutilized terminal areas with limited passenger flows during off-peak hours. Due to outdated operational procedures, hardware and software, the EMCS is no longer utilized to its full potential. In the past, shut-down of lighting and cooling during off-peak hours conflicted with custodial operations, creating uncomfortable working conditions for staff during evening shifts. In response, DOT-A has begun the process of updating the EMCS to address these functionality issues, supplemented by a draft energy policy.

For the baseline, Tenants account for approximately 19.35% (18,848,025 kWh) of energy use, while the DOT-A accounts for the remaining 80.65% (78,542,816 kWh), of which general terminal areas consume 82.08% (62,128,279 kWh), chillers and equipment consume 17.20% (13,016,453 kWh + 544,511 kWh), and non-terminal facilities and airfield consume 0.72% (2,447,893 kWh + 405,680 kWh) of DOT-A electricity. The median energy consumption measured 8,025,236 kWh, with a low of 6,947,120 kWh in March and a high of 9,166,032 kWh in February.

SUB-METERING & TENANT REPORTING

In accordance with Act 155, all State operated facilities are required to benchmark their energy consumption using the ENERGY STAR® Portfolio Manager, an interactive management tool that tracks and assesses energy (and water) consumption in buildings, which is then compared to the performance of similar facilities in similar climates. As such, HNL has become one of the few airports in the Nation to utilize the ENERGY STAR® Program. This is possible in part due to the EMCS, which enables airport operators to sub-meter the energy consumption of individual spaces and facilities throughout the airport property—an important process for understanding the dynamics of overall electricity consumption, conservation, and efficiency practices.

Some Tenants privately manage their individual electricity bills directly through the Hawaiian Electric Company, while other Tenants pay for electricity through DOT-A, in which case, that Tenant is charged a standard flat rate per occupied square foot. Although Tenant sub-meters have been installed since 1991, there are gaps in Tenant electricity consumption data; therefore, the total electricity



Monthly Electricity Use, Tenant / DOT-A

The top graph illustrates the month-to-month use of electricity use in 2009. The bottom graphs depict corresponding weather data that may or may not have a direct influence on electricity consumption throughout the year.
**source: DOT-A & DBEDT*

consumption of the HNL campus is difficult to quantify. These gaps in data are the result of how the current billing structure, the inability to fully operate the EMCS to utilize sub-metering, and unenforced Tenant reporting protocol. As a result, Tenants paying for electricity through DOT-A are currently charged according to a standard flat rate per square foot, not according to how energy intensive any particular Tenant operation may be. As DOT-A upgrades the EMCS, there will be more opportunity to track Tenant energy use and charge them by actual energy consumption.

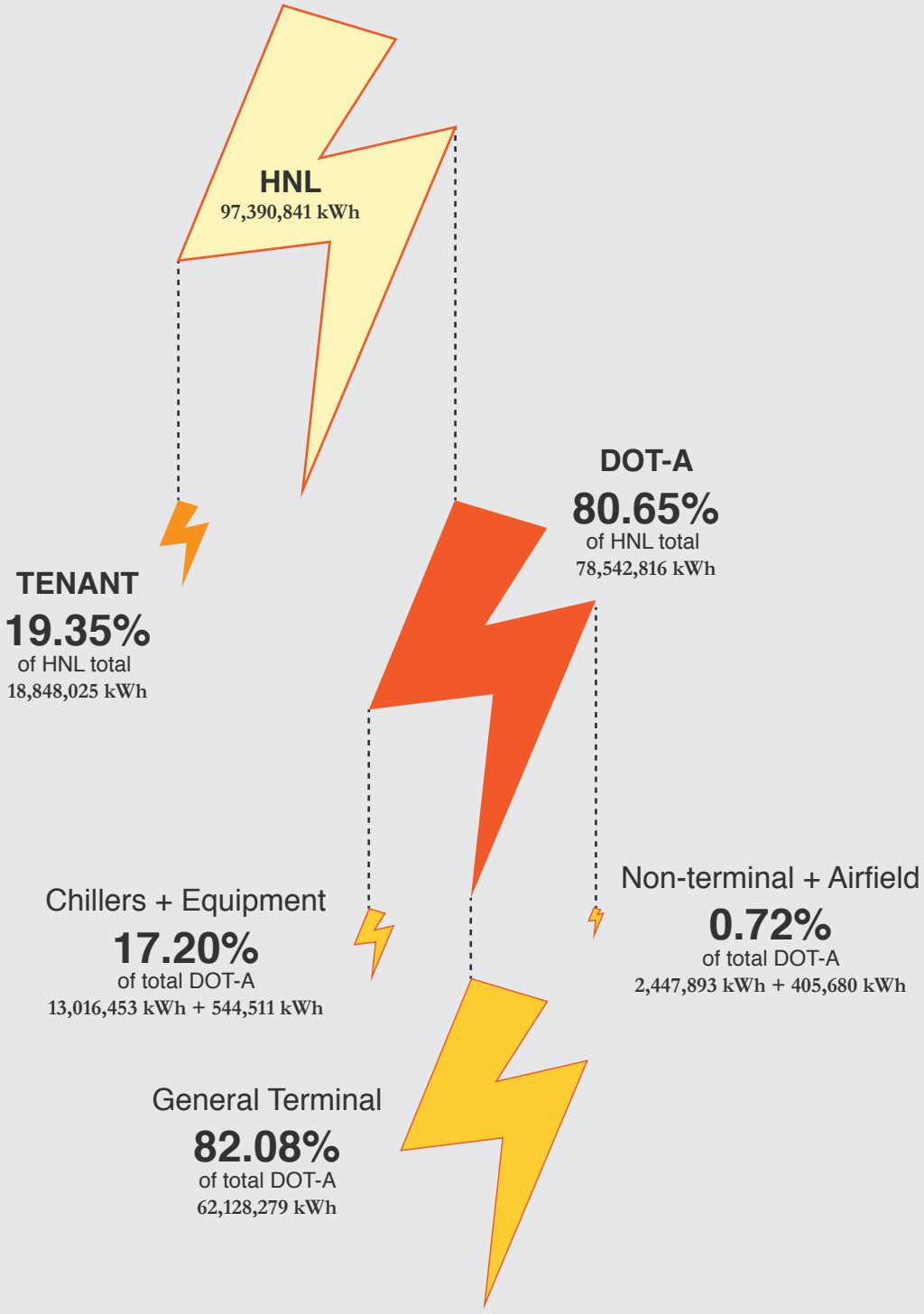
LIGHTING & EQUIPMENT RETROFITS

In the past years, DOT-A has taken measures toward energy efficiency through retrofits to the lighting system and mechanical equipment. Over 1,755 taxiway lights and transformers were retrofitted with low cost, high-intensity Light Emitting Diodes (LED). All 30-watt incandescent taxiway lamps were replaced with 1-watt high-intensity LED lamps. Efficient transformers have replaced the 30/45-watt isolation transformers that existed previously. Over 286 guidance signs were also retrofitted with compact fluorescent lamps (CFL), where 50-watt high-pressure sodium lamps were replaced with 18-watt CFLs. In total, these retrofits have resulted in an annual conservation of over 600,000 kWh totaling more than $54,000 savings each year. In addition, all T-12 fluorescent lights were replaced with more efficient T-8 fluorescent lights with electronic ballasts, and incandescent light fixtures at the Interisland parking structure were replaced with efficient fluorescent fixtures, improving energy efficiency from 175-watts to 85-watts per light with five times the life expectancy. Rebate programs have complemented all of these energy efficiency efforts, such as HECO's Energy$olution for Business Program that provided over $30,000 in rebates, and HECO's Green Lights Project that provided $96,000 in rebates. Significant energy consuming mechanical cooling components controlled by DOT-A include the chiller plants —which provide chilled water for cooling use throughout the terminal spaces. A new chilled water loop was installed to replaced a chiller plant, which conserves nearly 3,850 kWh annually.

HNL is looking to replace the existing 400Hz ground power sources with more energy efficient converters, minimizing the need to run the aircraft's on-board auxiliary power units (APU) powered by jet fuel, and ground power units (GPU) powered by diesel. Currently, DOT-A provides complementary ground power to air carriers because the 400Hz ground power sources are currently unmetered. However, if the 400Hz are sub-metered, DOT-A can charge the air carrier appropriately to recover retrofit and maintenance costs

RENEWABLE ENERGY

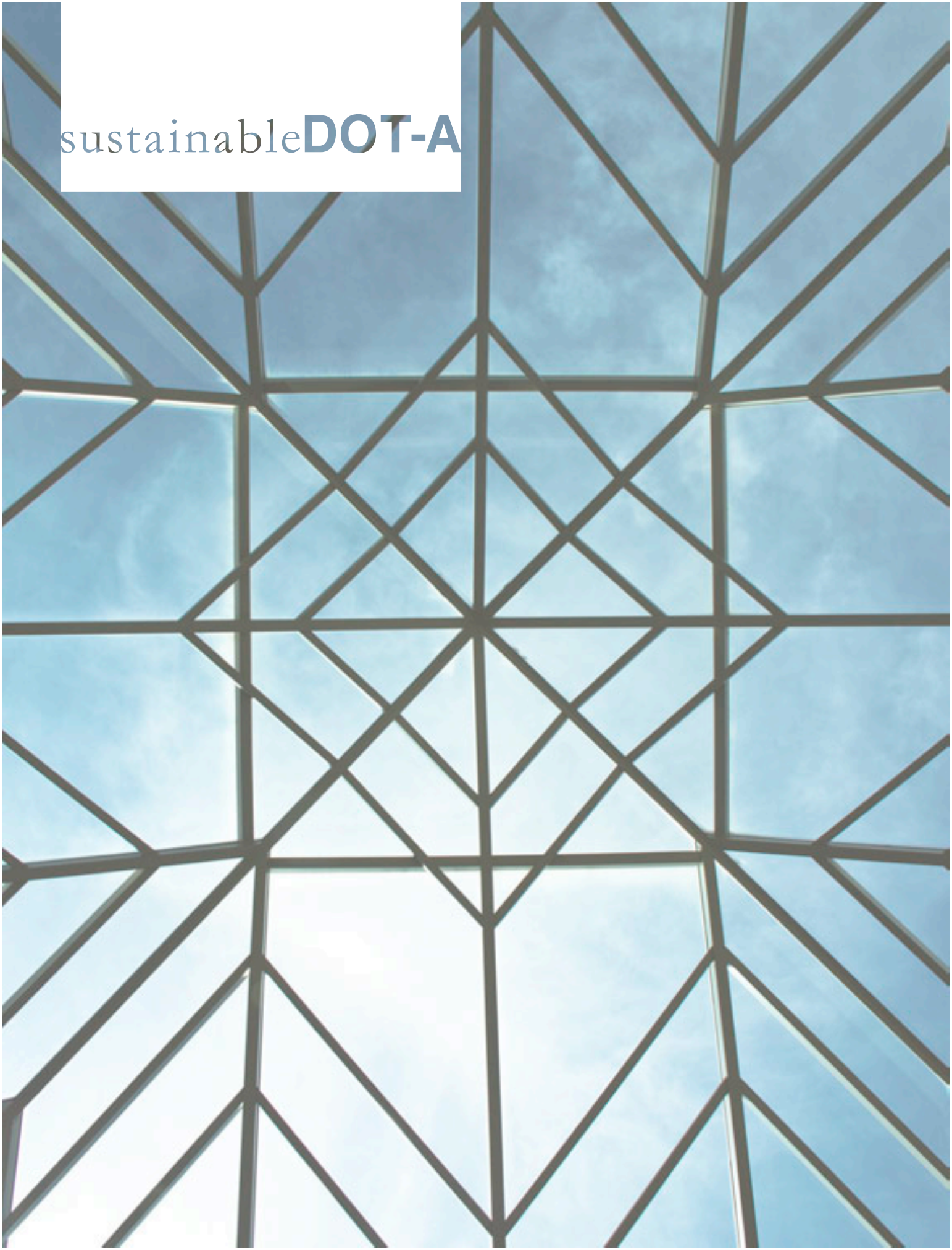
HNL has among the first commercial wind projects to qualify under HECO's Net Energy Metering (NEM) program. As a pilot project, 16 1-kWh wind turbines were installed to supplement the electrical needs for the airfield's electrical vault. Each turbine measures six feet by eight feet and is situated to maximize the natural acceleration in wind speed resulting from the building's aerodynamic properties. Between March and December of 2009, 8,474 kWh were generated. These figures are directly proportional to seasonal wind speeds. Compared to conventional wind turbine designs, the prototypes installed at HNL operate with less noise and vibration.



Total Electricity Use, Tenant / DOT-A

This diagram illustrates both the percentage of total HNL electricity use by the Tenant and DOT-A (top energy bolts), as well as the percentage of electricity generation per Tenant/DOT-A according to the electricity consumption category.
**Source: DOT-A*

sustainableDOT-A

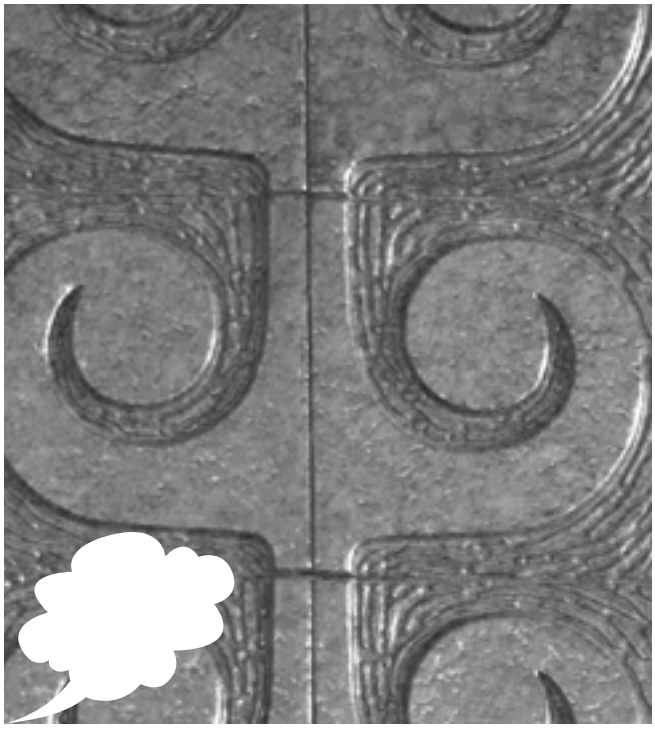


MOVING forward

As the airport model for the Hawai‘i Department of Transportation—Airports Division’s SustainableDOT-A (sDOT-A) program, the *SustainableHNL Elements Baseline* provides a basis for understanding current management practices for carbon, waste, water, and energy at HNL. The DOT-A is poised to contribute insight and expertise to Hawai‘i and the aviation industry as best practices in sustainability emerge.

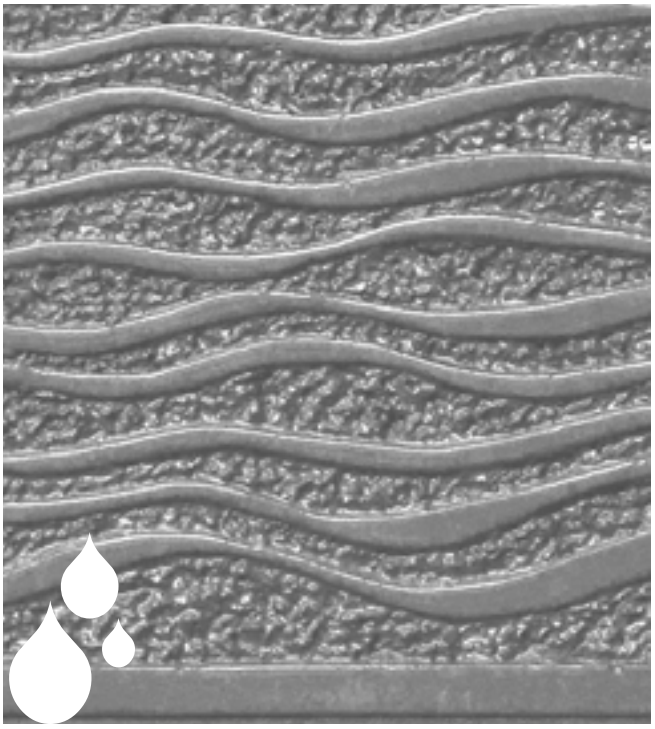
Moving forward, DOT-A strives to mitigate overall carbon emissions, implement more greywater recycling, increase energy and water efficiency measures, generate renewable energy, and divert more waste through composting, recycling, and waste prevention. In pursuit of these goals, a variety of opportunities exist at the airport level for each Element. Identifying potential benefits is a crucial step for both sHNL and sDOT-A moving forward.

KEY OPPORTUNITIES



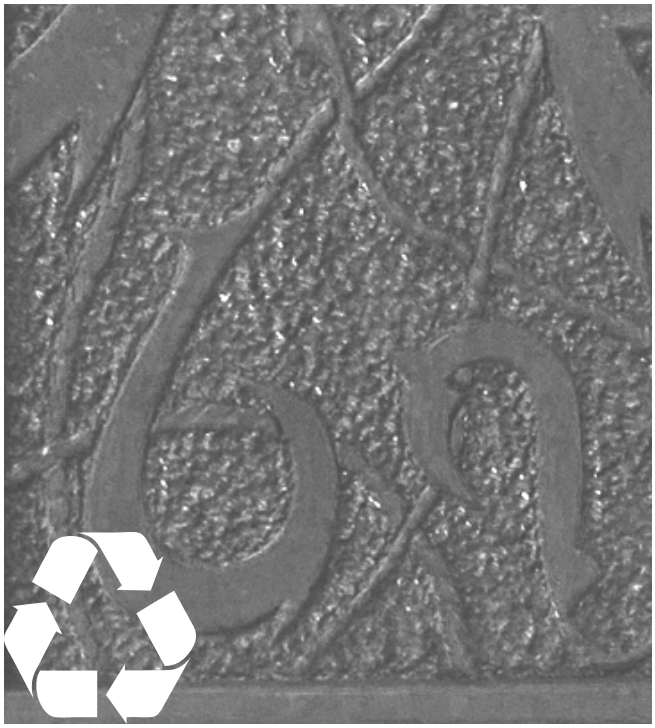
CARBON

- » Develop a comprehensive carbon management plan and policy.
- » Integrate energy efficiency for all airport-wide operations.
- » Generate clean and renewable energy for all airport-wide operations and facilities.
- » Convert ground support equipment to low-emitting and fuel-efficient vehicles.
- » Encourage use of low-emitting and fuel-efficient buses, shuttles, rental cars, taxis, and limousines.
- » Promote ride-share programs and alternative transportation for public passengers and airport personnel.
- » Identify and contain refrigerant gas leaks.
- » Streamline airport operations for maximum jet fuel efficiency and conservation.
- » Register HNL carbon emissions with a national GHG registry.
- » Aircraft towing during taxiing to the gates.



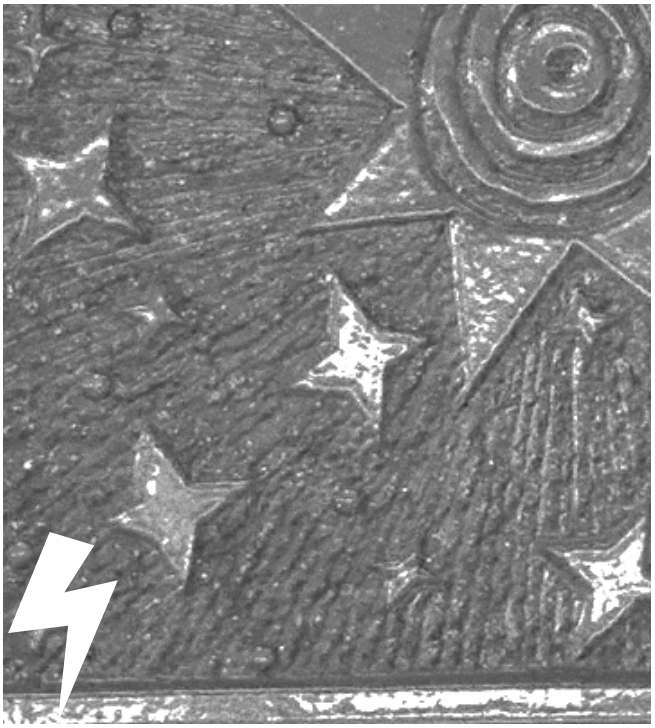
WATER

- » Develop a comprehensive water management plan and policy.
- » Increase water efficiency and conservation awareness and protocols.
- » Conduct a comprehensive water audit.
- » Install potable water and wastewater sub-metering for all airport facilities.
- » Integrate sub-metering into existing energy management control system.
- » Maximize stormwater and wastewater recycling.
- » Implement on-site stormwater and wastewater treatment.
- » Increase stormwater retention and on-site infiltration.



WASTE

- Develop a comprehensive waste management plan and policy.
- Assess benefits for a centralized waste management system.
- Increase diversion from landfill and incineration.
- Increase recycling, composting, and prevention.
- Utilize sealed compactors instead of open-top front-loading dumpsters.
- Develop protocols for waste data monitoring and reporting.
- Expand scope of Waste Element to construction and demolition debris.
- Create a recycling contract for public area recycling collection and hauling.



ENERGY

- Develop a comprehensive energy conservation management plan and policy.
- Increase energy efficiency and conservation.
- Update energy management operational procedures.
- Integrate sub-metering into existing energy management and control system (EMCS).
- Incentivize Tenants to be energy efficient.
- Implement a voluntary energy reporting program for all Tenants.
- Generate clean and renewable sourced electricity for facilities.
- Assess potential for utilizing energy service performance contracts.

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