



Aviation's climate action takes off

Collaborative climate action across the air transport world

MULTI-STAKEHOLDER PARTNERSHIPS ON AVIATION ALTERNATIVE FUELS

The table below contains a (non-exhaustive) list of multi-stakeholder initiatives and projects, initiated by aviation partners, currently in progress for the development and deployment of sustainable alternative fuels in aviation:

LOCATION	PROJECT	PARTNERS	DETAILS
Global	Sustainable Aviation Fuel User Group (SAFUG)	Air China, AeroMexico, Air France, Air New Zealand, Alaska Airlines, ANA, AviancaTaca, British Airways, Cargolux, Cathay Pacific, Etihad Airways, GOL, Gulf Air, Japan Airlines, KLM, Lufthansa, Qantas, Qatar Airways, Scandinavian Airlines, Singapore Airlines, South African Airways, TAM, TUI Travel, United Airlines, Virgin America, Virgin Atlantic, Virgin Australia, Boeing, UOP, Airbus, Embraer, ASA	The Sustainable Aviation Fuel Users Group was formed in 2008 with support and advice from the world's leading environmental organizations such as the Natural Resources Defense Council and the Roundtable on Sustainable Biomaterials (RSB). The group is focused on accelerating the development and commercialization of sustainable aviation biofuels
Australia	Mallee Tree Study	Airbus, Virgin Australia	Airbus and Virgin Australia commissioned a two-year study in 2012 to investigate the feasibility of using the Mallee tree as a feedstock for sustainable biofuels.
Australia	Australian Aviation Biofuel Study	Australian Renewable Energy Agency (ARENA), Australian Government	A 2013 report assessed the feasibility of an Australian aviation biofuel industry concluding that domestic production is viable but significant obstacles remain.
Australia	Australian BioPort	SkyNRG, Virgin Australia, Brisbane Airport Corporation	Partnership established in 2013 to assess the feasibility of establishing Australia's first BioPort providing sustainable biofuel to aircraft at Brisbane Airport using local feedstock.
Australia	Australian Initiative for Sustainable Aviation Fuels (AISAF)	Air New Zealand, Qantas Airways, Virgin Australia, Airbus, Boeing, GE, CSIRO	Partnership established in 2012 to develop a roadmap addressing key opportunities and challenges to develop alternative jet fuels value chains in south east Asia
Brazil	Joint Research Center for the Advancement of Sustainable Aviation Biofuel in Brazil	Boeing, Embraer	The two companies will perform joint biofuel research starting in 2014, as well as fund and coordinate research with Brazilian universities and other institutions. The research will focus on technologies that address gaps in a supply chain for sustainable aviation biofuel in Brazil, such as feedstock production and processing technologies.
Brazil	Farnesane Bio Jet Fuel	Amyris, GOL, Total	First commercial flight (undertaken in 2014) using renewable jet fuel derived from Farnesane between Orlando, Florida and Sao Paulo, Brazil.
Canada	Sustainable fuels in Canada	Airbus, Air Canada and BioFuelNet	Partnership to assess Canadian solutions for the production of sustainable jet fuels with long-term goal to supply Air Canada.
China	China Gutter Oil	COMAC, Boeing, HEET	Technology center project aimed at developing aviation biofuel from "gutter oil"
China	Chinese value chain study	Airbus, Tsinghua University, China Eastern Airlines	Partnership to evaluate the first steps in the establishment of a value chain in China.
European Union	SOLAR-JET	European Union, ETH Zurich, Bauhaus Luftfahrt, DLR, Shell, ARTTIC	Research project initiated in 2011 to develop 'solar' jet fuel from water and carbon dioxide using concentrated light as a high-temperature energy source.

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European Union	CORE – Jet Fuel	FNR, Bauhaus Luftfahrt, WIP, SENASA, IFPEN, EADS, Innovation Works	Partnership to support European Union in implementing a coordinated research strategy for alternative jet fuels and to connect EU initiatives and stakeholders.
European Union	Initiative Towards Sustainable Kerosene for Aviation (ITAKA)	Senasa, Airbus, Embraer, Neste Oil, SkyNRG, Camelina Company España, KLM, USAMVB	Partnership to develop a full value-chain in Europe to produce sustainable Synthetic Paraffinic Kerosene (SPK) at a large enough scale to allow testing in existing logistic infrastructures and in normal flight operations in Europe.
European Union	European Advanced Biofuels Flight Path	Airbus, AirFrance/KLM, Biomass Technology Group, British Airways, DG Energy, Lufthansa, Neste Oil, UOP	Cooperation launched in 2011 between major European industry stakeholders to define a roadmap and milestones in order to achieve a target of 2 million tons of sustainable biofuels used in European civil aviation by 2020.
France	Joining Our Energies – Biofuels Initiative France	Airbus, Air France, Safran (Snecma), Total (Amyris), Direction General de l'Aviation Civile (DGAC)	Partnership to support French initiatives on sustainable alternative fuel for aviation. Demonstration flight from Toulouse to Le Bourget on an Airbus A312 with sharklets in June 2013.
Germany	Biokerosene Emissions Testing	European Union, Lufthansa Technik	As a part of the EU 'Blending Study' project initiated in 2013, Lufthansa has been assessing the impact on aircraft emissions and engine performance of blending Farnesane with conventional kerosene.
Germany	Aviation Initiative for Renewable Energy in Germany (AIREG)	Lufthansa, Rolls-Royce, Shell, Neste Oil, Air Berlin, Boeing, Booz & Company Inc., Airbus Group, DLR etc.	Organization founded in 2011 to support the development and introduction of renewable fuels for aviation in Germany as well as provide information about their demand, origin, availability and use.
Hong Kong	Cathay Pacific Biofuel Investment	Cathay Pacific, Fulcrum BioEnergy	Cathay Pacific secured an agreement in 2014 with Fulcrum BioEnergy to supply 375 million US gallons of sustainable aviation fuel to the airline over 10 years.
Japan	Initiatives for Next Generation Aviation Fuels (INAF)	Japan Airlines, All Nippon Airways, Nippon Cargo Airlines, Narita International Airport Corporation, Boeing, and 30 other organizations	Plan a roadmap towards using nationally sourced aviation biofuels by 2020, when the Olympic and Paralympic Games are to be held in Tokyo
Malaysia	Sustainable Fuel Centre of Excellence	Airbus, Aerospace Malaysia Innovation Centre (AMIC), Malaysian Industry Government Group for High Technology (MiGHT)	Airbus and key Malaysian partners are assessing local solutions for sustainable bio-mass production in Malaysia. The aim is to determine the most suitable feedstock to ensure that any future jet fuel production in the region is based only on sustainable solutions. The first assessment is expected to be completed by December 2014.
Northern Europe	Biofuel Partnership	Statoil Aviation, SkyNRG	Long term partnership to accelerate the supply and demand of sustainable aviation biofuel in the Nordic region, initiated in 2014.
Northern Europe	Nordic Initiative for Sustainable Aviation (NISA)	SAS, Finnair, Atlantic Airways, Aviation authorities of Denmark, Sweden, Norway, Finland, Copenhagen Airport, Boeing, Volvo, Airbus etc.	Partnership (from 2013) to establish a regional body with the aim of facilitating and strengthening the conditions for commercial and continuous access to sustainable jet fuels.
Norway	Biofuel Development in Norway	Avinor	Avinor, Norway's state-owned airport operator and air navigation services provider, pledged to contribute USD 16.5million towards the development of aviation biofuel in Norway over a ten-year period beginning in 2014.
Qatar	Qatar University Biofuel Project	Qatar University, Qatar Airways, Qatar Science and Technology Park	Program initiated in 2012 to find a way of producing affordable, sustainable biofuels which do not rely on the use of valuable arable land and can be produced efficiently in the harsh climate of Qatar.
Russia	Sustainable Biofuels	Airbus, RT-biotekhprom	Partnership to conduct a large-scale analysis of feedstock in Russia using stringent sustainability criteria, and identify opportunities for commercialization established in 2013
South Africa	Solaris Bio Jet Fuel	Boeing, SkyNRG, South African Airways, Sunchem,	Development of sustainable jet fuel production using modified tobacco crops which meet the sustainability criteria of the Roundtable of Sustainable Biomaterials (RSB).
South Africa	Biofuel Supply in Southern Africa	Boeing, South African Airways	The partnership, established in 2013, will assess how sustainable biofuel aviation fuel supply chains can be developed and implemented in South Africa.
Southeast Asia	Southeast Asia Sustainable Aviation Fuel Initiative (SEASAFI)	Association of Southeast Asian Nations (ASEAN); Association of Asia Pacific Airlines (AAPA), Sustainable Aviation Fuel User Group (SAFUG)	2013 workshop to develop a roadmap addressing key opportunities and challenges to develop alternative jet fuels value chains in south east Asia
Spain	Bioqueroseno	Spanish Ministries of Transport, Environment and Agriculture, IDAE, AESA, Airbus, Camelina Company España, UOP, CLH, Iberia	Organization formed in 2010 to promote the development of a sustainable bio-kerosene industry in Spain through the implementation of the entire value chain.

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Sweden	BioPort Karlstad	SkyNRG Nordic, Karlstad Airport	Installation of a tank facility in 2014 capable of supplying sustainable jet fuel to all commercial flights departing from Karlstad Airport.
The Netherlands	BioPort Netherlands	KLM, Dutch Government, Neste Oil, Port of Rotterdam, Schiphol Airport, SkyNRG	The partnership, initiated in 2013, is intended to scale up the production of sustainable jet fuels in the Netherlands and set up a supply chain.
United Arab Emirates (UAE)	Harvesting Biofuel from Desert Plants	Boeing, United Arab Emirates, Sustainable Bioenergy Research Consortium (SBRC), Etihad Airways, Honeywell	In 2014, Boeing and research partners in the United Arab Emirates have made breakthroughs in sustainable aviation biofuel development, finding that desert plants fed by seawater will produce biofuel more efficiently than other well-known feedstocks.
United Arab Emirates (UAE)	BIOjet Abu Dhabi	Etihad Airways, Boeing, Takreer, Total and Masdar Institute of Science and Technology	BIOjet Abu Dhabi will engage a broad range of stakeholders to develop a comprehensive framework for a UAE biofuel supply chain, including research and development and expanded investment in feedstock production and refining capability in the UAE and globally.
United Kingdom	Green Sky London	British Airways, Solena	Construction of a biofuel plant in London, which will convert municipal waste into biofuels for use in British Airways flights from London airports due to be completed by 2017
United States	Commercialization of Bio Ethanol	Byogy Renewables, Avianca Brasil	Partnership to support the approval of alcohol-to-jet (ATJ) fuel processing technology allowing sustainable alternative fuels to be used at any blend ratio (up to 100%) initiated in 2014.
United States	Renewable Isobutanol	Gevo, Lufthansa	Partnership established in 2014 to promote and evaluate the use of isobutanol produced using Gevo's patented alcohol-to-jet process as a drop-in jet fuel.
United States	Green Diesel	Boeing, Federal Aviation Administration, Diamond Green Diesel, Dynamic Fuels, Neste Oil, and other biofuel producers	Since 2013, Boeing has been working with the U.S. Federal Aviation Administration and other stakeholders to gain approval for aircraft to fly on 'green diesel', which has the potential to significantly reduce carbon emissions.
United States	Hawaii biofuels purchase agreement	Alaska Airlines, Hawai'i Bioenergy	Hawai'i BioEnergy will ramp up production of the sustainable fuels within five years of regulatory approval, allowing Alaska Airlines to begin procuring sustainable jet fuel for its Hawaii flights possibly as soon as fall 2018.
United States	Sustainable Aviation Fuels Northwest (SAFN)	Alaska Airlines, Boeing, Port of Seattle, Boeing	Study group established in 2011 to develop a roadmap for aviation biofuels in the Pacific Northwest region of the United States
United States	Midwest Aviation Sustainable Biofuels Initiative (MASBI)	United Airlines, Boeing, and 40 other organisations	Partnership between United Airlines, Boeing, and 40 other organisations across the American Midwest with the objective of supporting the emergence of a regional biofuel industry in a region heavily engaged with agriculture.
United States	Northwest Advanced Renewables Alliance (NARA)	Catchlight Energy, Facing the Future, Gevo, GreenWood Resources, National Center for Genome Resources	Alliance to create a sustainable industry to produce aviation biofuels and important co-products.
United States	Farm-to-Fly	United States Department of Agriculture (USDA), Airlines for America (A4A), Boeing	Partnership initiated in 2010 and renewed in 2013 to accelerate the availability of a commercially viable and sustainable aviation biofuel industry in the United States
United States	Delta partners with the Carbon War Room	Delta Air Lines, Carbon War Room	Partnership to promote and develop sustainable alternative jet fuel worldwide.
United States	Commercial Aviation Alternative Fuels Initiative (CAAFI)	FAA, ACI-NA, AIA, A4A	CAAFI's goal is to promote the development of drop-in alternative jet fuel options that offer equivalent levels of safety and compare favourably on cost with petroleum based jet fuel, while also offering environmental improvement and security of energy supply for aviation.
United States	AltAir Fuels	AltAir Fuels, United Airlines	Partnership with purchase agreement for 15 million gallons of cost-competitive, commercial-scale, sustainable aviation biofuel to be used on flights departing LAX beginning in 2014

MITIGATION ACTIONS ACROSS THE INDUSTRY

In every part of the world, airlines, airports, air navigation service providers and manufacturers are working with each other and stakeholders on projects to reduce emissions. Here is a brief overview of some of these efforts, launched, deployed or updated since October 2013. This list is a small summary of the variety of actions taking place around the world. All parts of the industry are involved and more examples can be found by visiting www.aviationbenefits.org/newswire and www.enviro.aero.

T NEW TECHNOLOGY

O OPERATIONAL MEASURES

I EFFICIENT INFRASTRUCTURE

M MARKET-BASED MEASURES

LOCATION	PROJECT	PARTY and/or PARTNERS	DETAILS	
Asia Pacific	Green Aviation Routes	Airways New Zealand, IATA	Airways New Zealand introduced seven new 'green aviation routes' in Asia Pacific that decrease emissions through improved fuel efficiency.	O
Australia	Alice Springs Solar Farm	Alice Springs Airport	325 kW of solar photovoltaic capacity is being added to complement the existing 235 kW of renewable power generated at Alice Springs Airport.	I
Australia	Carbon Offsets	Virgin Australia, Tasmanian Land Conservancy	Virgin Australia is offering its customers the option to offset their emissions in partnership with the Tasmanian Land Conservancy, covered by the Verified Carbon Standard.	M
Australia	Wireless Inflight Entertainment	Qantas	Traditional inflight entertainment systems (IFE) can weigh over a tonne on each aircraft. Some airlines, such as Qantas, are opting to provide wireless streaming and tablets that can significantly reduce aircraft weight when compared to traditional alternatives, saving fuel and emissions.	O
Australia	Flex Tracks	Airservices Australia, Emirates Airline	The Flex Tracks programme relays weather-related-information to airlines in real time allowing them to make efficient use of jet streams to reduce flight times and fuel consumption. Emirates was the first airline to pilot the project in 2003, now over 31 flights to and from Australia utilise the technology each day.	O
Brazil	E175 aircraft	Embraer Commercial Aviation	Launch of new E175 aircraft with improved aerodynamics that reduce fuel burn by up to 6.4%.	T
Brazil	Airport Photovoltaics	Onyx Solar, Campinas International Airport	Campinas Airport installed 31 photovoltaic skylights that cover an area of 33,000 square feet, and generate 117kWp while providing natural lighting that increases energy efficiency.	I
Brazil	FIFA World Cup Carbon Offsetting	TAM Airlines, Sustainable Cargo – Projetos Ambientais	TAM Airlines announced that it had offset 100,000 tonnes of greenhouse gases associated with aviation emissions from fans travelling to the World Cup.	M
Brazil	Green Skies of Brazil	GE Aviation, GOL airlines, 10 Brazilian airports	The Green Skies initiative has resulted in the deployment of Required Navigation Performance (RNP) operational procedures at 10 airports in Southeast Brazil increasing efficiency and reducing fuel consumption.	O
Brunei	A320neo	Royal Brunei Airlines	Royal Brunei Airlines bought new technology A320neo aircraft, expected in 2017/18, which will reduce the airline's fuel burn and emissions by an estimated 18%.	T
Canada	Windsor Airport Solar Farm	Windsor International Airport, The City of Windsor, Samsung	Windsor International Airport is developing a 400 acre solar farm.	I
Canada	New APU Technology	Bombardier Aerospace	Bombardier has developed and successfully tested a new auxiliary power unit that will reduce fuel use and carbon emissions due to its lower weight and longer life cycle.	T
China	Shanghai Airport Building-Integrated Photovoltaics	Shanghai International Airport, Upsolar	The BIPV system located between terminals 1 and 2 generates 1.7 megawatts, enough to cover the energy needs of the airport's parking facility and ground service equipment.	I
China	Live Weather Update Software	SITA, Air China	Air China is expecting to save around \$8 million in fuel costs each year due to live weather and payload update software.	O
China	Chinese Memorandum of Understanding	Airbus, Civil Aviation Administration of China (CAAC)	Cooperation for Air Traffic Management procedures signed between Airbus and CAAC which focuses on the improvement of Air Transport capacity and efficiency.	I
Columbia	Accion Verde - Protective Reforestation	Copa Airlines Columbia, Colombian Ministry of Environment, United Nations Environment Program (UNEP)	Copa Airlines is collaborating with local and international environment agencies to provide passengers with the opportunity to offset emissions by reforesting and protecting the Colombian rainforest.	M

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Cook Islands	Airport Solar Power	Rarotonga Airport	Installation of 3,800 solar panels.	I
Costa Rica	Carbon Neutral Air Travel	NatureAir, Terra Pass, Carbon Fund	NatureAir has implemented company-wide carbon neutral operations meaning that each ton of CO ₂ during its operations is offset in regional projects.	M
Dominican Republic	Cibao Airport Solar Farm	Cibao International Airport, SolarWorld	Cibao International Airport installed a 1.5 MW photovoltaic farm that provides around half of the airport's energy requirements.	I
El Salvador	Required Navigation Performance Arrivals	Avianca, Monsenor Oscar Arnulfo Romero International Airport, Airbus ProSky	Avianca completed a successful trial of performance based navigation (PBN) in the airspace around San Salvador, a first step in the planned implementation across the Central America region.	O
European Union	A330-800neo	Airbus	Launched A330-800/900neo reducing fuel consumption by 14% per seat compared to previous generation of A330s.	T
European Union	CASCADE	European Union, Airports Council International	Partnership between multiple European airports to develop a software system that detects faults and control errors in lighting and HVAC systems. The pilot projects at Rome and Milan Airport are expected to save an estimated 600 MWh at the Italian Airports (42,000 tons of carbon emissions).	I
European Union + Asia-Pacific, North America, Africa	Airport Carbon Accreditation programme	Airports Council International, WSP Environment & Energy	Airport Carbon Accreditation is an independent, voluntary programme overseen by an Advisory Board, developed following a 2008 resolution of Airports Council International Europe, when its member airports committed to reduce carbon emissions from their operations, with the ultimate goal of becoming carbon neutral. Airports applying to become accredited must have their carbon footprints independently verified in accordance with ISO14064 (Greenhouse Gas Accounting). Over 100 airports in Europe, North America, Asia-Pacific and Africa are taking part in the programme. This past year alone, the collective efforts of European airports in the programme yielded a net reduction of 353,842 tonnes of CO ₂ , enough to power 147,781 households for a year.	I
European Union	Green Taxiing System	Airbus, Safran, Honeywell	Partnership to further evaluate the development of the eTaxi system which would allow aircraft to push back from gates without assistance and taxi to and from runways without the use of engines resulting in reduced emissions.	T
European Union	Clean Sky	European Commission, European Aerospace Industry	€1.6 billion research programme that supports over 20 projects aimed at reducing the environmental impact of aviation.	T
European Union	Fuel Efficiency Software	Aviaso, Aer Lingus, SkyWork Airlines, Thomson Airways, Corsair, TUIfly Nordic, Arkefly	Several European airlines have implemented specialist fuel efficiency software that monitors individual flights to identify opportunities for fuel savings and other efficiency improvements.	O
Fiji	Fleet Renewal	Fiji Link, Fiji Airways	Fiji Link has begun receiving ATR 42-600 aircraft that are more fuel efficient than the aircraft being replaced.	T
France	SkyBreathe Fuel Efficiency	SkyBreathe, Aigle Azur, Enter Air	SkyBreathe provides airlines with software that uses data from flight recorders to identify opportunities for improved fuel efficiency.	O
France	Atmospheric Monitoring	Air France	Air France joined Lufthansa and China Airlines, as airlines who have installed atmospheric measuring equipment on aircraft to support international climate research, providing a unique high-altitude view for climate science.	
Germany	Electric Ground Operations Vehicles	Lufthansa Cargo	The purchase of 31 energy-efficient forklift trucks and 9 electric tractors is expected to result in a 14% energy-efficiency improvement from previous models.	I
Germany	Green Hydrogen Hub	Berlin Branderburg Airport, Total Deutschland, Linde, MyPhy Energy	Berlin Airport is producing hydrogen on-site via electrolysis using wind and solar energy which provides energy to fuel cell electric vehicles used at the airport.	I
Germany	TaxiBot	Lufthansa Technik, Kalmar Motor	Partnership is aimed at developing an electrically-powered hybrid towbarless tractor for aircraft as large as A380s to replace existing diesel variants.	I
Germany	Fuel Savings Milestone	airBerlin	A new fuel-efficiency record was set by airBerlin in 2013, having achieved an average fuel consumption of 3.3 litres per 100 passenger kilometres (an annual emissions reduction of over 70,000 tonnes)	O
Germany	Lightweight Cabin Windows	Schott	German glass manufacturer has developed a new lightweight glass structure for cabin windows that is easier to clean, more robust than traditional alternatives, and provides a 40% reduction in weight resulting in reduced emissions.	T

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Germany	Airport Emissions Reductions	Hamburg Airport	The installation of fixed ground entry points at 17 aircraft positions have resulted in savings of 9,200 tonnes of CO ₂ emissions each year. Improvements in HVAC systems, standardized temperature control, and ground operations vehicles powered by natural gas have resulted in a further 2,445 tonnes of CO ₂ reductions.	I
Germany	Climate Research	Lufthansa	2014 marked the 20th anniversary of Lufthansa contributing to weather forecasting and climate modelling using specialized equipment installed on its aircraft.	I
Hong Kong	Airport LED Lighting	Hong Kong International Airport	Hong Kong Airport is committed to replacing traditional light bulbs with 100,000 LEDs in its passenger terminals by the end of 2014.	I
India	Airport Solar Power	Airports Authority of India (AAI)	AAI is in the process of constructing solar power plants at 30 airports in India to reduce emissions.	I
India	Required Navigation Performance (RNP)	Airports Authority of India, GE Aviation	GE Aviation is providing technical support to Airports Authority of India to assist in the deployment of RNP flight paths across India, which have the potential to result in reduction of 252,000 tonnes of CO ₂ each year.	O
India	ATC Modernization	Netaji Subhash Chandra Bose International Airport	A modern air traffic control center using automated technologies will not only provide safety improvements but also increased capacity and more efficient flight paths that can result in emissions reductions.	I
India	Improved flight management	Tiruchi International Airport, Civil Aviation Authority of India	New standard instrument arrival and standard instrument departure procedures are reducing the time of flights by 7 to 12 minutes, improving safety and reducing carbon emissions.	O
Indigo	Carbon Offsets for Rural Development	Indigo, Fair Climate Network (FCN)	Customers with Indigo who opt to offset their travel are able contribute to one of 36 climate mitigation projects helping families in rural India.	M
Ireland	Airport Energy Savings	Dublin International Airport, Sustainable Energy Authority of Ireland (SEAI), Energy Supply Board of Ireland (ESB)	Partnership to achieve 30% energy saving at Dublin Airport using optimized load management; low-carbon technologies and zero emissions transport solutions.	I
Japan	Airport Mega Solar Power Plant	Kansai International Airport, Development Bank of Japan, Solar Frontier	A 11.6 MW solar power plant has been installed at Kansai airport.	I
Kazakhstan	Flight management ITS	Air Astana, SITA	Air Astana has implemented information technology services provided by SITA that are expected to provide fuel savings of 100 kilograms per flight.	O
Kenya	Fleet renewal	Kenya Airways	Kenya Airways received its third B787-8 Dreamliner in August 2014. The new aircraft are 20% more fuel efficient than the 767s they are replacing.	T
Kuwait	Airport LEED Gold Status	Kuwait International Airport, Leadership in Energy and Environmental Design (LEED)	Developers of Kuwait's new airport are incorporating energy efficient technologies in an attempt to achieve LEED gold status.	I
Latin America	Ultra-light Kevlar Cargo Containers	LATAM Airlines Group, Nordisk Aviation Products	LATAM purchased 3,517 ultra-light Kevlar containers used to transport air cargo, which are expected to result in reductions of up to 10,000 tonnes of carbon dioxide emissions each year.	O
Latvia	Arrival Modernisation for Better Efficiency in Riga (AMBER)	airBaltic	Advanced navigation techniques for turboprop aircraft using satellite guidance have been implemented at Riga Airport, resulting in emissions reductions and fewer delays.	O
Malaysia	Airport Solar Power	Malaysia Airports Holding Berhad, SunEdison	Installation of a 19 megawatt system – the largest in Malaysia – will significantly reduce emissions and energy costs at 39 airports.	I
New Zealand	Airport Solar Power	Air New Zealand, Auckland Airport	Installation of solar array expected to generate 160,000 kWh.	I
New Zealand	Airport Energy Efficiency	Energy Efficiency and Conservation Authority (EECA), Auckland Airport	Auckland Airport has committed to investing NZD3 million to improving airport energy efficiency to achieve the target of a 6 GWh reduction, and cutting carbon emissions by 1,000 tonnes.	I
New Zealand	New ATC Systems	Airways' Auckland	New air traffic control (ATC) systems have resulted in significant fuel efficiency improvements: Arrivals Manager system has reduced over 1,770 tonnes of carbon emissions; Collaborative Flow Manager system has saved airlines over 11,000 tonnes of fuel.	O
Philippines	Performance-based Navigation	Civil Aviation Authority of the Philippines, Honeywell, Hughes Aerospace	Partnership to develop performance-based navigation procedures for Daniel Z. Romualdez Airport enabling more efficient aircraft operations.	O
Qatar	Real-time Wind Data	Boeing, Qatar Airways	Qatar agreed with Boeing to implement the Boeing Wind Updates system across its fleet, allowing the airline to optimize flight paths and enhance efficiency.	O

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St Kitts & Nevis	Airport Solar Power	Robert L. Bradshaw International Airport, SpeedTech, St. Christopher Air and Seaports Authority (SCASPA)	A one-megawatt solar farm has been installed on the airport which is expected to reduce energy costs by up to \$800,000 each year.	I
Thailand	Fleet Renewal	Thai Airways	Thai received delivery of its first of six Boeing 787 aircraft in August 2014, providing a 20% improvement in fuel efficiency and carbon emissions over the aircraft being replaced.	T
Thailand	Thai Airways Smarter Fuel Efficiency	Airbus, Thai Airways	Thai Airways purchased fuel monitoring and assessment systems from Airbus which will aid the carrier in uncovering opportunities to enhance fuel efficiency.	O
United Arab Emirates	Gate-to-Gate Fuel Optimisation	Etihad Airways, CAAs, ANSPs and Airport Ground Service Providers	Etihad Airways conducted a study to identify opportunities for reducing fuel consumption on its route between Sao Paulo and Abu Dhabi.	O
United Kingdom	Heathrow Energy Center	Heathrow International Airport	When the Energy Center achieves full operation it will offset an estimated 40,000 MWh/year of gas and 12,000 MWh/year of electricity, saving around 13,000 tons of carbon emissions a year, by using biomass and other renewable technologies to provide power and heating to the airport.	I
United Kingdom	Energy-efficient Flight Simulators	British Airways, Heathrow Airport	The BA training facility was recently upgraded to provide increased energy efficiency. The 18 flight simulators at the training facility use more electricity than most other operations at Heathrow Airport.	O
United Kingdom	Aircraft Replacement	Virgin Atlantic	Virgin Atlantic purchased 10 new Airbus 330s which are around 30% more fuel efficient than the aircraft they replace. At the end of 2014, the first of 16 Boeing 787 will be delivered which are estimated to be 21% more efficient than the aircraft they replace.	T
United Kingdom	Flight Efficiency Partnership	NATS	Improved flight planning enabled 19,000 tonnes of fuel saving in 2013.	O
United Kingdom	Continuous Descent Operations	Sustainable Aviation	Sustainable Aviation, a coalition of industry partners, launched a Continuous Descent Operations campaign aimed at achieving a 5% increase in CDOs, which reduce CO2 emissions of landing aircraft, across the UK.	O
United Kingdom	3Di Flight Tracking	NATS	NATS is expecting to achieve a 600,000 tonnes aviation emissions reduction in 2014 compared with historic levels using its three-dimensional inefficiency (3Di) tracking metric.	O
United States	CarbonChoice	United Airlines, Sustainable Travel International	Introduction of a tool that allows cargo customers to offset the carbon emissions associated with their shipments.	M
United States	Energy Conservation	Port Authority of New York and New Jersey	The Port Authority authorized \$7.5 million for energy conservation improvements at John F. Kennedy International Airport (JFK).	I
United States	Voluntary Airport Low Emission (VALE)	Federal Aviation Administration (FAA), Denver International Airport	The FAA provided a \$442,500 grant to Denver International Airport to reduce all sources of ground emissions at the airport.	I
United States	Split Scimitar Winglets	United Airlines, Aviation Partners Boeing	A new winglet technology has been retrofitted to a United Airlines Boeing 737 for the first time. Once deployed, and alongside other winglet technology on the airline's 737, 757 and 767 fleet, United expects to reduce emissions through this project by 645,000 tonnes.	T
United States	Electrification of Vehicles	Seattle-Tacoma International Airport, Alaska Airlines, Port of Seattle	Project to convert the remaining airfield vehicles from fossil fuels to electric power – electrification of up to 650 vehicles will reduce emissions and energy costs.	I
United States	SFO Natural Ventilation	San Francisco International Airport	The airport is developing a system to use cool ambient air from the San Francisco Bay as the primary source of air-conditioning thereby avoiding the use of energy-intensive HVAC systems.	I
United States	Hawaiian airports energy improvements	Department of Transportation, Department of Business, Economic Development, and Tourism	A new energy efficiency programme at Hawaiian Airports will cut energy use by 49% and saving over \$518 million in energy costs over the next 20 years.	I
United States	New Aircraft Development	Boeing	Boeing's newest aircraft, the 777x, will increase fuel efficiency by up to 12% compared to today's aircraft. Boeing has received 259 orders which will be delivered starting in 2020.	T
United States	ecoDemonstrator programme	Boeing, NASA, FAA CLEEN, American Airlines, TUI Travel, and other airlines and suppliers	Multi-year programme focused on accelerating the testing, refinement and completion of new technologies to improve aviation's environmental performance	T
United States	Air Transportation Center of Excellence	Federal Aviation Administration (FAA), Washington State University, Massachusetts Institute of Technology	The FAA committed to providing \$40 million over ten years, in a public-private partnership with 14 leading American universities, to support research on noise, air quality, climate change and sustainable jet fuels.	T
Uruguay	Carrasco Airport Renewable Energy Self-sufficiency	Carrasco International Airport, Government of Uruguay, Puerta del Sur	A four hectare area is being developed as a photovoltaic farm expected to produce between 3 and 4 MW, enough to cover all the energy needs of the airport's new passenger terminal.	I