Eco-Skies: United’s environmental commitment and sustainability platform

Fuel Efficiency
Aircraft replacement, technology investment and process improvement

Alternative Fuels
Commercialization and utilization both in the air and on the ground

Product & Facility Sustainability
Innovation, recycling and product improvement

Stakeholder Engagement
Promoting accountability and awareness in protecting the environment

Environmental Compliance
United is committed to leading commercial aviation as an environmentally responsible company by taking actions today that shape an environmentally sustainable future.

32% improvement in fuel efficiency since 1994

85+ million gallons of fuel saved in 2013

Alternative Fuels
U.S. airline to sign definitive fuel supply agreement for sustainable aviation biofuel

Winglets
Installed on more than 330 aircraft; 5% reduction in emissions; North America launch partner split scimitars

280 new fuel efficient aircraft on order through 2022

New Cup
50% recycled content; recyclable in single-stream; United Clubs & In-Flight
As part of United’s commitment to improved communications and stakeholder engagement, we released an enhanced cargo emissions and offset calculator.

- Calculates per capita carbon emissions for customers shipping via United Cargo
- Only U.S.-based carrier to offer the calculator to its customers
- Methodology recognizes actual flight data (average payload, fuel burn, and distance) related to aircraft type, routes and seasonality
- Accounts for additional mass associated with passenger infrastructure (e.g., seats, galleys, etc.)
Aviation Industry Seeks Global Approach to reduce emissions, with following commitments

Subject also to government investment in technology, operations & infrastructure improvements

Source: IATA
Four Pillars for Aviation Industry GHG Emissions Reduction Strategy

1. Invest in new TECHNOLOGY (including sustainable aviation biofuels)

2. Fly using more efficient OPERATIONS

3. Build and use efficient INFRASTRUCTURE

4. Use effective, global, MARKET-BASED MEASURES

Source: IATA
Alternative fuels present a long-term opportunity to manage risks and continue United’s leadership

- Reduction of key environmental impact
- Alignment with stakeholder interests
  - Customers
  - Societal focus on carbon reduction
- Fuel diversification to protect against supply chain risks and manage a significant cost
- Strengthens the economy
- Inability in near-term to modify aircraft engines
United – Engagement in Advancing Alternative Fuels

2009: First North American Biofuel Test Flight

2010: First Demonstration Flight on synthetic fuel

2011: First US Commercial Biofuel Flight - 40% blend algae based renewable jet fuel

2012: Launch of Industry-Leading Collaborative, Midwest Aviation Sustainable Biofuels Initiative, MASBI to help in defining action plan for biofuel development regionally

United joins Sustainable Aviation Fuel Users Group (SAFUG)

2013: First to sign definitive fuel supply agreement with first use by U.S. carrier in on-going flights starting 2014
Midwest Aviation Sustainable Biofuels Initiative

- In May 2012, United led the development of the Midwest Aviation Sustainable Biofuels Initiative (MASBI) to drive integration across the value chain and define a regional roadmap to seek acceleration of commercial development.

- **Steering Committee Members:** United, Boeing, UOP Honeywell, Chicago Department of Aviation, Clean Energy Trust.

- **Members & Advisory Committee:**
  - Representing 40 different public, private, & non-profit org.
  - Including agriculture, industry leaders, technology providers, airport officials, policymakers, academic institutions & national laboratories.
  - Advisory Committee led by Argonne National Lab and included as advisors USDA, FAA, World Wildlife Federation.

- **Report:** Recommendations to policymakers, stakeholders and investors.
MASBI Outcomes – Key Recommendations to Further *Accelerate* Commercialization

- Improve feedstock production through agricultural innovation
- Tailor agriculture products such as oil-seed crops for jet-fuel production
- Investigate the impacts of uncertainty on production
- Advance technologies to convert lignocellulosic biomass
- Identify means to expedite approvals by the ASTM International and EPA
- Allow producers to optimize product portfolios
- Pursue deal structures that balance risk and reward for early adopters of technology
- Demonstrate industry demand with aviation jet fuel purchase guidelines
- Create pool of capital to invest in biofuels
- Create longer-term policies that enable investment and production
- Level the policy playing field for advanced biofuels with the conventional petroleum industry
- Fully fund the Defense Production Act Title III for the production of biofuels
- Build regional demonstration facilities supported by municipal and state policies
- Incorporate sustainability standards and advance certification

*Full Report at* [www.masbi.org](http://www.masbi.org)
Sustainable alternative aviation fuel produced by AltAir Fuels will fuel a portion of United’s LAX flights starting this year

| Technology | • HEFA Process  
|           | • Honeywell UOP’s Green Jet process  
|           | • Feedstock flexible including non-edible oils/agricultural waste  
| Fuel      | • 15 million gallons of bio jet and green diesel over 3 years  
| Location  | • United will use the biofuel on flights operating out of its Los Angeles hub (LAX)  
|           | • Delivery planned for Q3/Q4 2014  
| Lifecycle Impacts | • 50 percent reduction in CO₂ emissions as compared to traditional jet fuel  
| Refining | • Repurposed idled portion of a refinery to produce 30 million gallons total of renewable fuel  
| Logistics | • Fuel will be blended at the refinery near Los Angeles  
|           | • Finalizing logistics to United operations  
| Co-Products | • Refinery will produce green diesel, naphtha, and other distillates  

11
# Why AltAir Fuels?

<table>
<thead>
<tr>
<th>Key Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Technology for current fleet (or near term)</td>
</tr>
<tr>
<td>Management Credibility</td>
</tr>
<tr>
<td>Low Environmental Impact</td>
</tr>
<tr>
<td>Sufficient Financing</td>
</tr>
<tr>
<td>Near Term Commercial Production</td>
</tr>
<tr>
<td>Competitive Price Point</td>
</tr>
<tr>
<td>Logistics (near hub)</td>
</tr>
</tbody>
</table>

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
What’s Next?

Seeking greater quantities of alternative fuel

- United issued RFP Fall of 2013 seeking proposals
- Seeking alternative fuels for multiple locations
- Key factors remain: lower carbon, cost-competitive, can deliver

Challenges Remain

- Sufficient low-price feedstocks?
- Sufficient investor interest?
- Sufficient interest in alternative jet fuel production where higher certification requirements and potentially higher production costs than ground transportation fuels?

Alt fuels commercialization requires action today to ensure available in the future
Thank-you for your engagement in Alternative Fuels!