• Location: Paramount, California
• Process Technology: Catalytic Hydrotreating (Honeywell-UOP)
• Production Capacity: 3,000 bbls/day
• Feedstock: Inedible agricultural fats and oils
• Products: Renewable F-76 and JP-5
  Renewable Jet, Diesel and Gasoline
Significant Use of Reconfigured Assets….

The AltAir Paramount project reconfigured existing equipment significantly reducing capex and expediting several permitting requirements relative to a similar greenfield facility.

Supplemented with New Equipment…

The AltAir Paramount project also highlights a repeatable process that can be used to efficiently deploy similar conversions at other refineries.
Great Green Fleet
San Diego– January 20, 2016
Customer Diversity

Los Angeles World Airports

Oslo Airport
### Superior Product Specs and Market Acceptance

#### Preferred Compliance Fuel

<table>
<thead>
<tr>
<th></th>
<th>Petroleum ULSD</th>
<th>Biodiesel (FAME)</th>
<th>Green Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Content, %</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.84</td>
<td>0.88</td>
<td>0.78</td>
</tr>
<tr>
<td>Cloud Point, °C</td>
<td>-5</td>
<td>-5 to +15</td>
<td>-20 to +10</td>
</tr>
<tr>
<td>Cetane</td>
<td>40 - 52</td>
<td>50-65</td>
<td>70-90</td>
</tr>
<tr>
<td>Sulphur, ppm</td>
<td>&lt;10</td>
<td>&lt;2</td>
<td>&lt;2</td>
</tr>
<tr>
<td>Energy Density, MJ/kg</td>
<td>43</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>Polyaromatics, vol-%</td>
<td>4 - 12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Colour</td>
<td>Clear</td>
<td>Light to Dark Yellow</td>
<td>Clear</td>
</tr>
<tr>
<td>Oxidative Stability</td>
<td>Baseline</td>
<td>Poor</td>
<td>Baseline</td>
</tr>
</tbody>
</table>

**Pure hydrocarbon means:**
- Engine Compatibility
- No Blend Wall
- Storage and Logistics Infrastructure Compatibility
US Biodiesel & Renewable Diesel Market
2000-15: Uneven Start Followed by Growing Demand

The Renewable Fuel Standard sets long-term policy to 2022, but EPA rulings, court cases, trade policy, and annual federal budget process create risk.

MGals

2,000
1,800
1,600
1,400
1,200
1,000
0

Supply
Demand

7.6 BLtrs
3.8 BLtrs

SuppIy
Demand

RD = renewable diesel (only HVO is currently commercialized);
MGals (million gallons); BLtrs (billion liters).
LA CARB Diesel + CAR + LCFS Fee - ?

- AltAir is primarily a rack seller
- In-State ratable production is advantageous
- Blender credit lapse has reduced volume and consistency of imports
- Reduced supply relative to demand combined with increasing product familiarity has facilitated near price parity with petroleum diesel
Meets fuel performance requirements
Requires NO change to airplanes or engines
Requires NO change to infrastructure
Can be mixed or alternated with Jet-A fuel

• ASTM standard approved in May 2011 for up to 50/50 blend of Biojet and Jet-A
## Synthetic Paraffinic Kerosene (SPK) from a Bio-Derived Source

<table>
<thead>
<tr>
<th>Property</th>
<th>Jet A or Jet A-1</th>
<th>SPK</th>
<th>ASTM Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluidity</strong></td>
<td>Camelina Jet</td>
<td>Algae Jet</td>
<td></td>
</tr>
<tr>
<td>Freezing point, degrees Celsius</td>
<td>-40 Jet A</td>
<td>-63</td>
<td>-55</td>
</tr>
<tr>
<td><strong>Combustion</strong></td>
<td>-47 Jet A-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net heat of combustion, MJ/kg</td>
<td>42</td>
<td>44.0</td>
<td>43.5</td>
</tr>
</tbody>
</table>

* Data Provided by UOP

- Freezing point
- High temperature thermal stability
- Energy density
- Storage stability
- Elastomeric compatibility
- Must be a replacement solution
- Meet ASTM fuel specs
- Have a low CO₂ footprint

**23 °C Lower Freeze Point**

**Nearly 4% more energy content**
Meets fuel performance requirements
Requires NO change to airplanes or engines
Requires NO change to infrastructure
Can be mixed or alternated with Jet-A fuel

Customer Demand Signals

The Challenge: Carbon-Neutral Growth

Using less fuel
- Efficient airplanes
- Operational efficiency

Changing the fuel
- Lower lifecycle CO₂
- No infrastructure modifications
- “Sustainable Biofuel”

Sustainable aviation biofuel is an essential growth enabler

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Renewable Naphtha + Petroleum Blendstock + Ethanol

- Naphtha is the third hydrocarbon product produced with jet and diesel
- Finished gasoline is approximately 50% renewable material
- Approved RFS pathway for D5 RIN generation
- LCFS pathway application being processed
• From 2005 to 2010, biomass-based diesel’s usage of feedstock increased to over 2 billion lbs.

• From 2010 to 2015 this usage increased over 370% to over 9.9 billion lbs.

• Primary incremental feedstocks are yellow grease and the onset of DCO availability.

• From 2015 to 2026, usage is projected to increase approximately 65%.
Biomass-Based Diesel Feedstock Pricing

- Prices for most biomass diesel feedstocks are tied very closely to soybean oil.

- However, the price discount to soybean oil has been narrowing over the past several years due in large part to the California LCFS and the demand for low-CI fuels. As the California LCFS regulations tighten, the carbon price increases, which in turn increases the value of feedstocks that produce low CI fuels.

- The prices of most feedstocks are expected to remain at a discount to SBO, though the discounts are expected to narrow.
**Biomass-Based Diesel Feedstock Pricing**

Cheap today → Expensive tomorrow

- Low value uses
- High value uses

Low CI = More Credits = More Value (§) = More Demand = Higher Feed Price
Don’t Be A Policy Loser!
Legal, Agency and Legislative Policy Hurdles

- 2018 RVO and the 2019 biomass-based diesel requirement
- Americans for Clean Energy, Inc. et al. v. EPA, et al
- Requests to EPA for change of RFS Point of Obligation
- Renewable Enhancement and Growth Support Rule
  (E85 clarification, additional credit options, biointermediates, etc.)
- Potential legislative reform of RFS
- Argentinian anti-dumping/countervailing duty case
- BTC vs PTC, if anything
- 2 POET, LLC and others v. California Air Resources Board LCFS lawsuits
Thank You