Alcohol To Jet ("ATJ")
Emerging Through ASTM
Why Alcohols As a Feedstock?

• ATJ is **NOT** about producing “alcohols”...It **IS** about the conversion of the alcohols into jet fuel

• Does not rely on “magic bugs” or special enzymes;

• All steps are currently used in commercial scale in the petrochemical industry;

• Catalytic process that is capital efficient and scalable;

• The process does not require external hydrogen and hydro-processing like FT, HEFA
ATJ : The Big Picture

• There are many types of crude oil with a framework refining process which can adapt to make jet fuel

• Many types of feed-stocks in GTL/FT and HEFA process

Alcohol to Jet is fundamentally no different

There are many different feed-stocks (alcohols)
• Conventional -- fermenting sugars/startchs
• Industrial microbiology -- new pathways to alcohols
• Algae
ATJ : The Most Competitive Process

- The Most Volume
- The Lowest Cost
- The Fastest Time

Primary Difference From GTL/FT and HEFA

Oligomerization is the “Building Of C Chains”

Oil Based Process requires the “Breaking Down” of C Chains”
ATJ: The Technical Process

4 Step Process:

- Contains no “new” technological breakthroughs
- All processes are widely used in commercial scale
- No special enzymes or bugs

Step 1: Ethanol Dehydration
Step 2: Oligomerization
Step 3: Distillation
Step 4: Hydrogenation

ALCOHOL

JET FUEL
ICAQ AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

Wednesday, 19 October 2011

Diagram of alternative fuels production processes.
ATJ: Estimated Timeline

Q4 2010 to Q4 2011
- Specification Properties
  - ASTM Review & Ballot
  - ASTM Specification

Fit-For-Purpose Properties
- ASTM Balloting Process
- Revised ASTM D7566 Spec

Q1 2012 to Q3 2012
- Component/Rig Testing
- Engine/APU Testing
- FAA & OEM Review & Approval
- ASTM Research Report

Q4 2013 – Q2 2014
- Q3 2013

Q4 2012 to Q2/Q3 2013
ATJ : The Task Force Framework

Within the ATJ Process Framework

different companies have designed, or are using, the framework process to produce different fuels.

This results in some companies producing synthetic kerosene ...

with aromatics (SKA’s – 100% Stand alone)

and without (SPK’s – Blend-stock Fuels)
Weight % n-Paraffins

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**BYOGY 100% Jet**

- **JP-8**
  - n-C7, n-C8, n-C9, n-C10, n-C11, n-C12, n-C13, n-C14, n-C15, n-C16, n-C17, n-C18, n-C19

- **4751 JP-8**

- **7572**

- **7563**

- **7490**
Qatar Advanced Biofuels Platform (QABP)
Qatar Airways
Qatar Science & Technology Park
Qatar Petroleum

Developing a Global Supply Chain
stay tuned...