



**ICAO AVIATION AND SUSTAINABLE  
ALTERNATIVE FUELS  
WORKSHOP**

ICAO Headquarters, Montréal, Canada

18 to 20 October 2011



# Alcohol To Jet (“ATJ”)

## Emerging Through ASTM





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## 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



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## 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/starches*
- *Industrial microbiology -- new pathways to alcohols*
- *Algae*



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## 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”

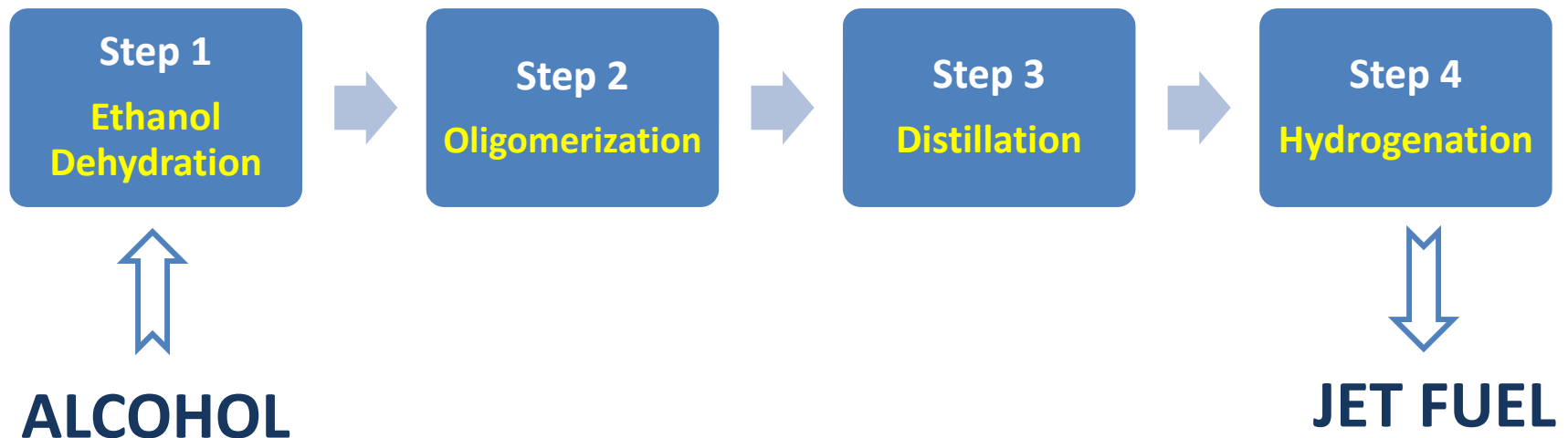
Oil Based Process requires the “Breaking Down” of C Chains”



# 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







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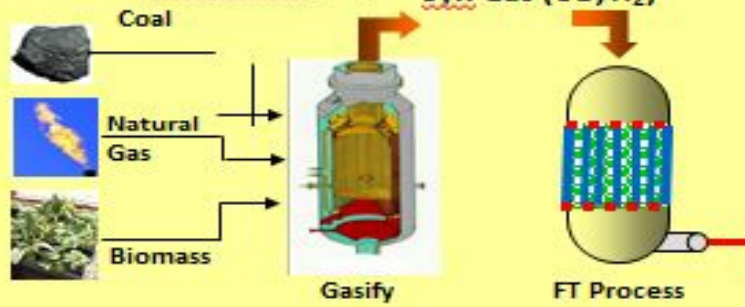
D 1655

## Petroleum



D 7566  
Annex A1

## Fischer-Tropsch (FT)



## Conventional Refinery Processes



## Hydro-processing



## Jet Fuel



D 7566  
Annex A2

## Hydroprocessed Esters & Fatty Acids (HEFA) from Bio-Oils



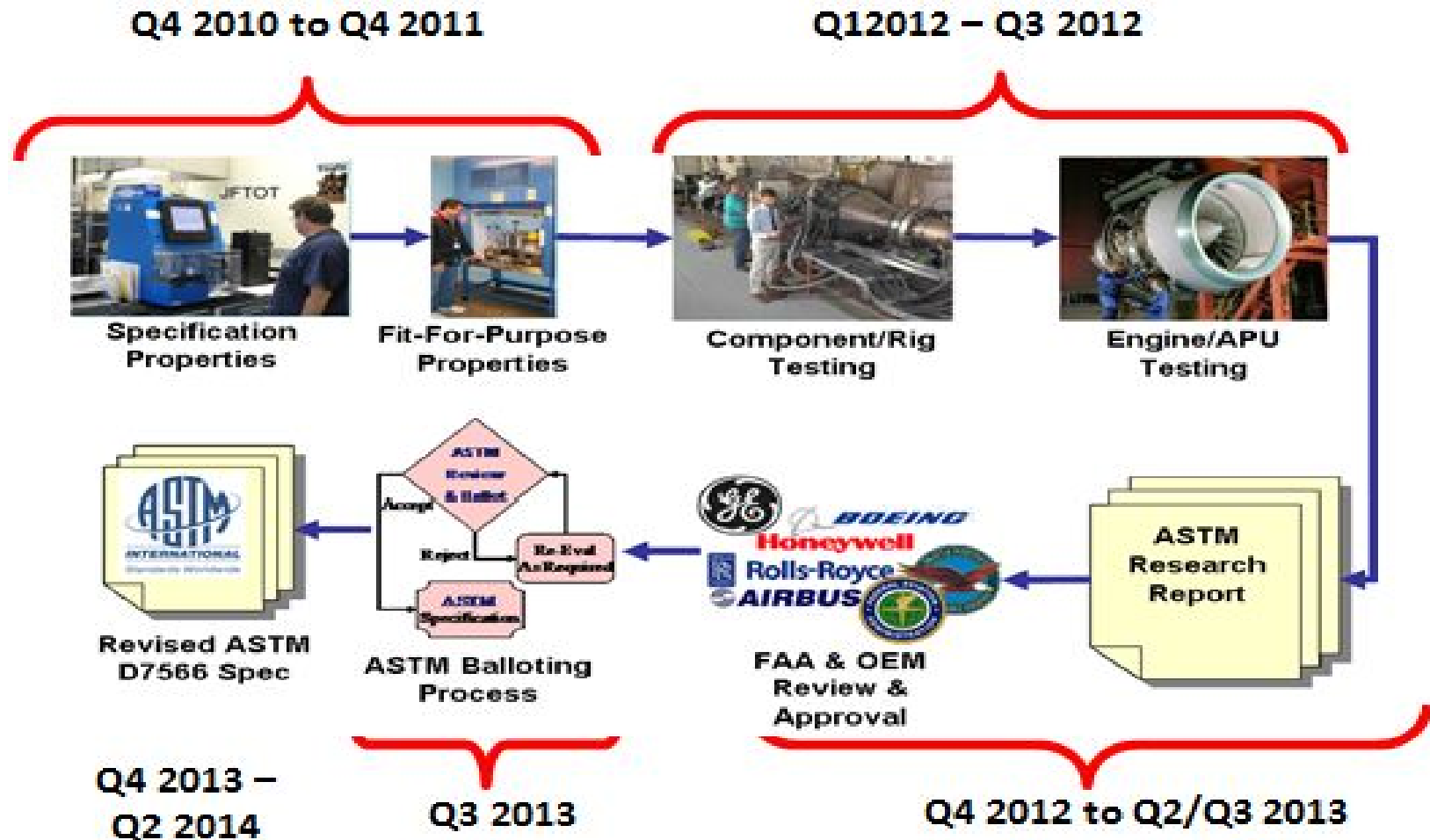
D 7566  
Annex A-?

## Alcohols To Jet (ATJ)





# ATJ : Estimated Timeline





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## 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)





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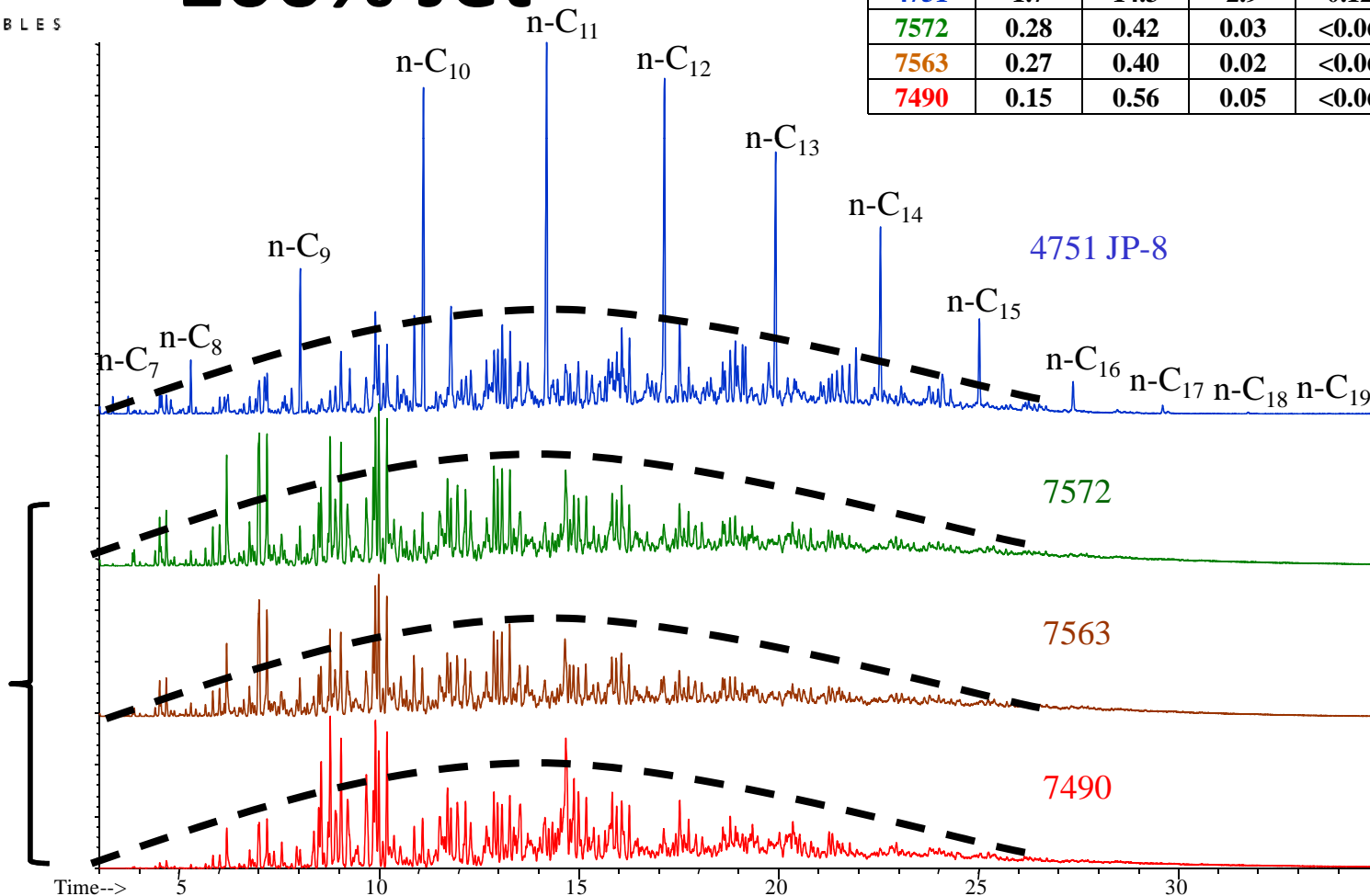


**BYOGY** 100% Jet  
RENEWABLES

Weight % n-Paraffins				
	C <sub>7</sub> -C <sub>9</sub>	C <sub>10</sub> -C <sub>13</sub>	C <sub>14</sub> -C <sub>16</sub>	C <sub>17</sub> -C <sub>19</sub>
4751	1.7	14.3	2.9	0.12
7572	0.28	0.42	0.03	<0.06
7563	0.27	0.40	0.02	<0.06
7490	0.15	0.56	0.05	<0.06

PETROLEUM  
JP-8

BYOGY FUELS





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## **Qatar Advanced Biofuels Platform (QABP)**

**Qatar Airways**

**Qatar Science & Technology Park**

**Qatar Petroleum**

## **Developing a Global Supply Chain**

*stay tuned...*