

An Analysis of Alternative Jet Fuel Supply for Manassas Regional Airport

Problem Definition

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Background

- **petroleum-based jet fuels**
 - Kerosene (long chain Carbon (C12))
 - Energy of kerosene relative to gasoline
 - Why does aviation use kerosene and not gasoline?
 - gasoline can explode, kerosene just burns
- **Alternative bio jet fuels** (non petroleum-based jet fuels)
 - Sources include
 - Oils (algae, canola, soybeans)
 - Animal fats and greases
 - Biomass (Energy crops, crop residue, wood chips)
 - Municipal solid waste
 - Fossil fuels
 - Requirement
 - Use existing airport fuel storage
 - Common aviation fuel distribution network
 - With common piping and transport infrastructure / mechanisms
 - Any alternative should be “drop-in” and mixable with fossil fuel



- **Benefits**
 - Diversify jet fuel supply and decrease costs
 - Improve quality and security of jet fuel supply
 - Reduce volatility in jet fuel price
 - Provide regional economic and environmental benefits
- **Drawbacks**
 - there is a big issue with using food for bio-fuel, or using land that is otherwise used for growing food. and mixable with fossil fuel



Problem Statement

- **There are many challenges with introducing bio-based alternative jet fuel. They include:**
 - Feedstock availability
 - Proximity to airport
 - Competition for supply
 - Economics
 - Supply chain logistics
 - Cost volatility
 - Regulatory limitations
 - Safety
 - Environmental impact
- **Customer Need:**
 - The Virginia Joint Commission for Science and Technology (VJCS&T), the Washington Airport Task Force (WATF), Metron Aviation and CATSR/GMU want to know the best way to bring bio-based alternative jet fuel to Richmond, Dulles and Manassas airports.





Approach proposal & Preliminary Scope

- **Approach for evaluating options:**
 - Supply Chain Simulation
 - Economic Analysis
 - Risk Analysis
- **In Scope:**
 - Three types of airports: KHEF (small regional), KRIC (international, joint civil/military, medium level ops), and KIAD (major, international airport).
 - Biomass feedstocks
 - Oils (one of the appealing alternatives for Virginia appears to be rapeseed)
 - Weather effect on crops
 - Competition for crops and distribution pipelines
 - Effect of disruptions in supply
- **Out of Scope:**
 - Fossil fuel alternatives (Natural gas and coal)
 - Animal fat
 - Municipal solid waste





Questions?

