



Renewable Jet Fuels

Carbon War Room

September 2014

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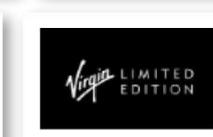
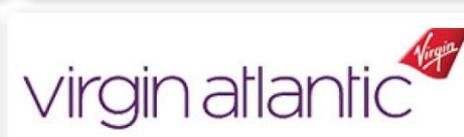
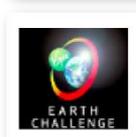
- I. Introduction to Renewable Jet Fuel and Leading Companies
- II. Overview of the RJF Forward Access Model





The Carbon War Room accelerates the adoption of business solutions that reduce carbon emissions at gigaton-scale and advance the low-carbon economy.

PARTNERS



Carbon War Room



Policy
not enough



The Market



Capital

CWR: Dismantling Market Barriers



Technology
not the bottleneck





Renewable Jet Fuels

and the Valley of Death

How To Scale Proven Technologies?



Renewable Jet Fuel Pathways



Natural Oils

Jatropha and Other Perennial Oilseeds

Camelina

Waste oil/tallow

Aquatic Micro-Organisms

Hydrotreating

Biomass

- Food-based starch crops (corn, sugarcane)
- Dedicated Energy Crops
- Residues/Waste streams

Thermochemical Conversion of Biomass

Hydrolysis of Biomass to Produce Sugars

Pyrolysis Oil

Liquid-Phase Catalytic Processing

Gasification to Fischer-Tröpsch

Fermentation of Sugars through GMOs to Produce Alcohols, Oils or Hydrocarbons

Further Refining to Produce Finished Fuels



Certain Demonstrated Technologies Exist



Base Value = \$80.81 cost per barrel in 2018 Dollars



Renewable Jet Fuel Deal Model



The Carbon War Room is helping to catalyze the development of a new, sustainable renewable fuel industry which will reduce GHG emissions, diversify the fuel supply, and reduce price volatility.

Airline Challenge: Airlines are subject to escalating, unpredictable fuel (& carbon) costs that are currently the largest single portion of operating costs.

Supplier Challenge: Low carbon, renewable jet fuels are not yet at commercial scale. Certain demonstrated technologies exist, but suppliers are facing the “Valley of Death”

Solution: Connect fuel consumers and fuel producers through a transaction that solves for both challenges.





What Do Airlines Need?

Fuel

- Certified (technical, sustainability)
- At or below market price (at volume)

Complete solutions

- Able to be integrated into existing business model without additional infrastructure or human capital investment

Airlines' constraints:

- Cannot purchase more than small volumes of fuel at price premium
- Generally do not make direct investments in external companies/assets
- Creditworthiness insufficient to support project loan with offtake agreement
- Limited control over physical fuel delivery infrastructure
- Challenges in sustainability credentials/messaging



Financial Structure



Airlines



RJF
Supplier(s)

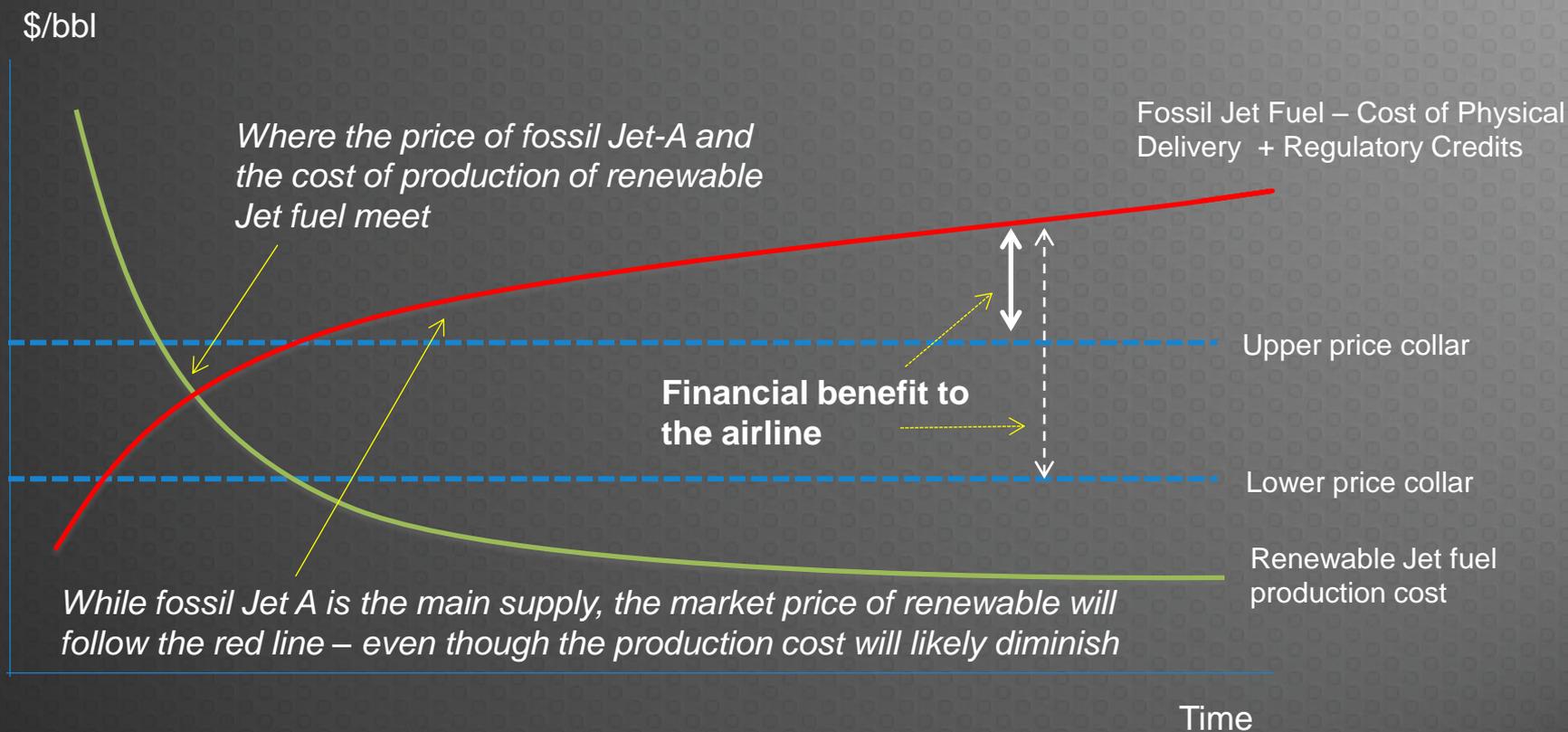
- Airlines buy long-dated contracts for sustainable renewable jet fuels specifying future volumes at a predetermined price structure.
- Fuel delivery will begin 1-5 years from date of contract signing and will continue for a specified multi-year period.
- The offering will be syndicated among a select number of airlines, limiting the expense and individual exposure of any one airline. The money raised through the sales of the RJF contracts creates a pool of non-dilutive capital that can be infused into selected renewable fuel producer(s).





Financial Structure

The opportunity is to access the rights to future output of competitively priced renewable fuels for physical delivery and carbon credits



- $Net\ Present\ Value\ of\ Contract = Total\ Fuel\ Savings\ Adjusted\ By\ Discount\ Rate$
- $Discount\ Rate = Airline's\ WACC + Fuel\ Project\ Risk$



Mutual Benefit



Benefits for Airlines

- The right/ability to purchase lower cost RJF over a long-term time horizon
- Reduced fuel prices and price volatility over the medium-long term
- An innovative vehicle to meet carbon emission reduction targets
- Airlines need not make direct investment in upstream companies or assets. No need to pay premiums for fuel today.
- Public relations benefits: taking concrete climate action, setting a precedent for the airline industry.



Mutual Benefit



Benefits for RJF Producers

- The fuel producer receives a much-needed short-term, non-dilutive cash infusion and a long-term off-take contract for fuel;
- Improved ability to attract the growth capital it needs to produce commercial volumes of fuel.





Thank You

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