

Report 1: Electric Transport Market Analysis

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Contents

1	Introduction	3
2	Section 1	3
2.1	A subsection	3
2.1.1	A sub subsection	3
2.2	(.	4
3	Conclusion	5
	References	6

List of Figures

1	PAX vs. Range	4
2	PAX vs. Deliveries	5
3	Cruise Speed vs. Range	6

1 Introduction

This document will dive into the market analysis of the current commercial aircraft market and recommend baseline requirements (passenger count, range, and cruise speed) for an electric, fuel cell, or hybrid transport aircraft. This analysis will focus on current widebody, narrow body, regional jet, and regional turboprop aircraft.

2 Section 1

Section text

2.1 A subsection

The figure below shows PAX vs. Range, with each marker sized by deliveries of each airplane. Note that there is a quasi-linear relationship between PAX and Range. This relationship is described by equation 1. Note that the error in slope is $\pm 5.7[NM/PAX]$. Note that the aircraft in the top right corner is the Airbus A380 which, at 242 deliveries, is below the benchmark of a succesful program (300 deliveries).

$$R = 18.3 * PAX \quad (1)$$

The figure below shows PAX vs. Deliveries.

2.1.1 A sub subsection

The assumed energy densities and efficiencies for each fuel type are tabulated below. Av gas and Jet A are included for comparison.

Type	η	Energy Density [kWh/kg]
Li-Ion	0.7	0.22
Li-S	0.7	2.6
H_2 Fuel Cell	0.7	33.30
Av Gas	0.335	12.22
Jet A	0.4	11.94

Note that the local maimum deliveries with respect to PAX is approximately 180 passengers. This results in a max range of 3300 NM using equation 1. For the

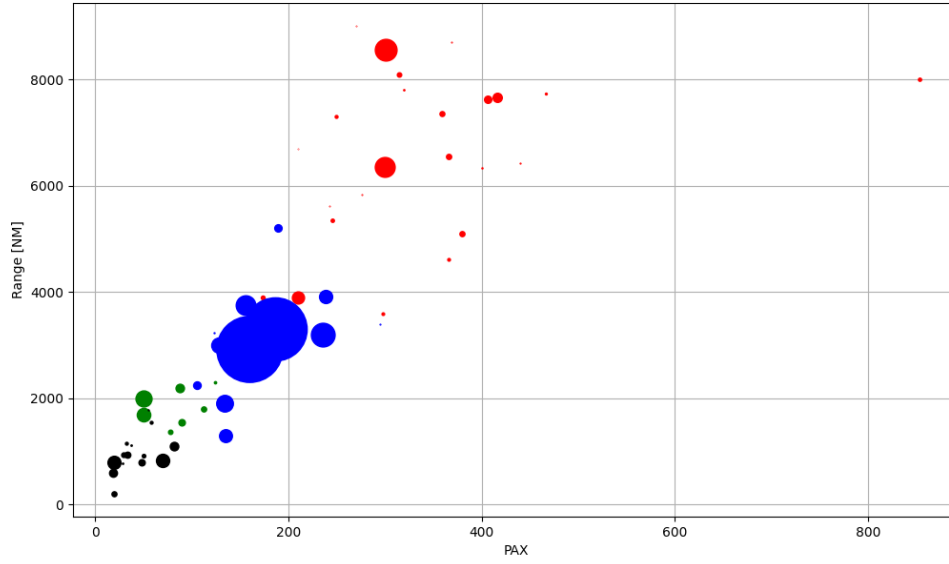


Figure 1: PAX vs. Range

purposes of this analysis, 180 PAX, at 3300 NM will serve as the upper bounds. Commercial transport cruise speeds, as of 2020, are limited by aerodynamic drag increase at transonic speeds. This limit will also serve as the bound of this analysis at 550 KTAS.

2.2 (Comparison)

Aircraft	M_{cruise}	Range	Pax	W [lbs]	Unit Price [2020 USD]
ATR 72	0.42	825	70	48482	1
AC H2	0.42	825	70	45277	1
AC LIS	0.42	825	70	55654	1

3 Conclusion

Conclusion text

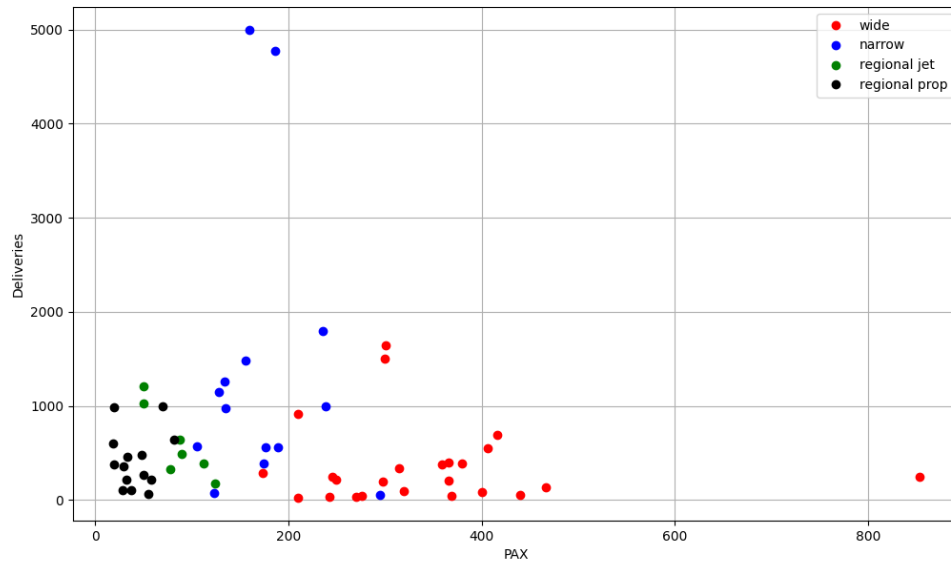


Figure 2: PAX vs. Deliveries

References

[1] authors. *name*. place, year.

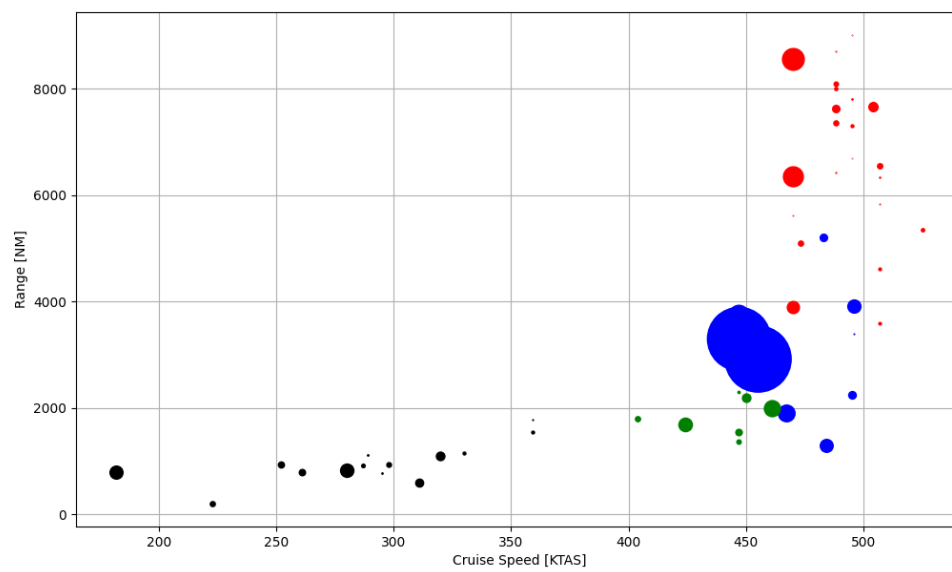


Figure 3: Cruise Speed vs. Range