

# Market Model Online Tool Scenarios Guide

## Acronyms and Terms

GDP – Gross Domestic Product	WB – Widebody Jets
RPKs – Revenue Passenger Kilometres	RJ – Regional Jets
GMF – Global Market Forecast	TP – Regional Turboprops
OEM – Original Equipment Manufacturer	ZC – Zero Carbon
NB – Narrowbody Jets	FC – Fuel Cell
MS – Midsize Jets	EIS – Entry Into Service
UE – Ultra-Efficient	

## 1. Delivery Forecasts

The ATI Market Model Online Tool contains forecasts based on Global Commercial Aircraft Deliveries and the Global Product Market (annual trend for global commercial aircraft systems and components) from 2018 up to 2050. The ATI Market Model forecasts begin as of 2023. Using regional, and subsequently global, GDP forecasts, regression analysis is undertaken of the Revenue Passenger Kilometers (RPKs) to forecast regional and global passenger demand. This in turn is used to evaluate global fleet and delivery forecasts by market class (market segment grouping) based on assumptions on fleet retirements rates and penetration rates of new aircraft types.

## 2. Aircraft Pricing

As part of the ATI Market Model inputs, the aircraft selling price is employed when defining aircraft pricing. The selling price is evaluated by applying a weighting factor (less than 1) to the OEM list prices. The weighting factors are defined by the market class grouping of an aircraft. This assumption is based on the fact that commercial aircraft are very rarely purchased at list price, but instead at a discounted price. Secondly, the aircraft prices are assumed to be constant as of 2022 prices in USD. Therefore, aspects such as inflation are not taken into consideration. Conversion of prices in USD to GBP is carried out by applying the current exchange rate when a major update to the ATI Market Model is carried out. Currently, the exchange rate of USD to GBP is 0.85; the average rate during the month of November 2022.

## 3. Scenarios

The market and economic scenario data is generated via the core ATI Market Model. There are three market scenarios currently active on the Market Model Online Tool and are based on strategies the ATI has considered with regards to ultra-efficient and zero carbon emissions aircraft entry into service dates, market penetration rates and the overall passenger demand. The ATI considers a number of scenarios for different purposes and releases publications based on the data generated from our market model, we have selected these three for the Market Model Online Tool as they align with significant publications released by the ATI.

The three market scenarios are:

- *ATI Technology Strategy Market Baseline*
- *FlyZero Regional First Unaccelerated*
- *FlyZero Midsize First Accelerated*

The highlighted market and economic scenarios are described and further discussed in [FlyZero Reports \(Market Forecasts and Strategy\)](#) and the [ATI Technology Strategy 2022 - Destination-Zero](#) documents that can be accessed via the ATI website.

*NOTE: The market scenarios described are aligned to already published FlyZero and ATI Technology Strategy scenarios. They do not take into account any key announcements and/or information that may considerably affect the ATI Market Model inputs and assumptions since their publications.*

*The exchange rate currently used may differ to that used when the FlyZero and ATI Technology Strategy findings were published, consequently showing different market value outputs.*

### **3.1. ATI Technology Strategy Market Baseline**

The *ATI Technology Strategy Market Baseline* is based on a moderate scenario adopted in line with the *ATI Technology Strategy – Destination Zero*. The ultra-efficient and ZC penetration rates are moderately applied and it is anticipated that passenger demand will recover by 2024 to 2019 levels and the growth thereafter will be in line with global GDP growth forecasts. The key aspects and assumptions, as presented in Figure 1, include:

- **Ultra-efficient 100% SAF capable** – In the early 2030s, two major OEMs are assumed to introduce 100% SAF capable ultra-efficient narrowbody (NB) aircrafts, with another introduced in the early 2040s by a 3<sup>rd</sup> OEM. One midsize (MS) and a widebody (WB) ultra-efficient jets are introduced in 2040 by 2 major OEMs while a 3<sup>rd</sup> OEM introduces a widebody ultra-efficient jet in the late 2040s.
- **Zero Carbon** – Two new zero-carbon emissions (ZC) turboprops (TP), by two different OEMs, are the first ZC aircraft to be introduced in 2027. It is assumed that one is fully electric, while the other is based on Hydrogen Fuel Cell (H2FC) propulsion. A hydrogen-based ZC combustion regional jet (RJ) is introduced by 2035, paving way for the introduction of a Hydrogen based ZC combustion NB jet by a major OEM by 2040. Another major OEM introduces a hydrogen-based ZC combustion NB approximately 7 years later. Finally, a midsize ZC aircraft is introduced in 2050 by one of the major OEMs.

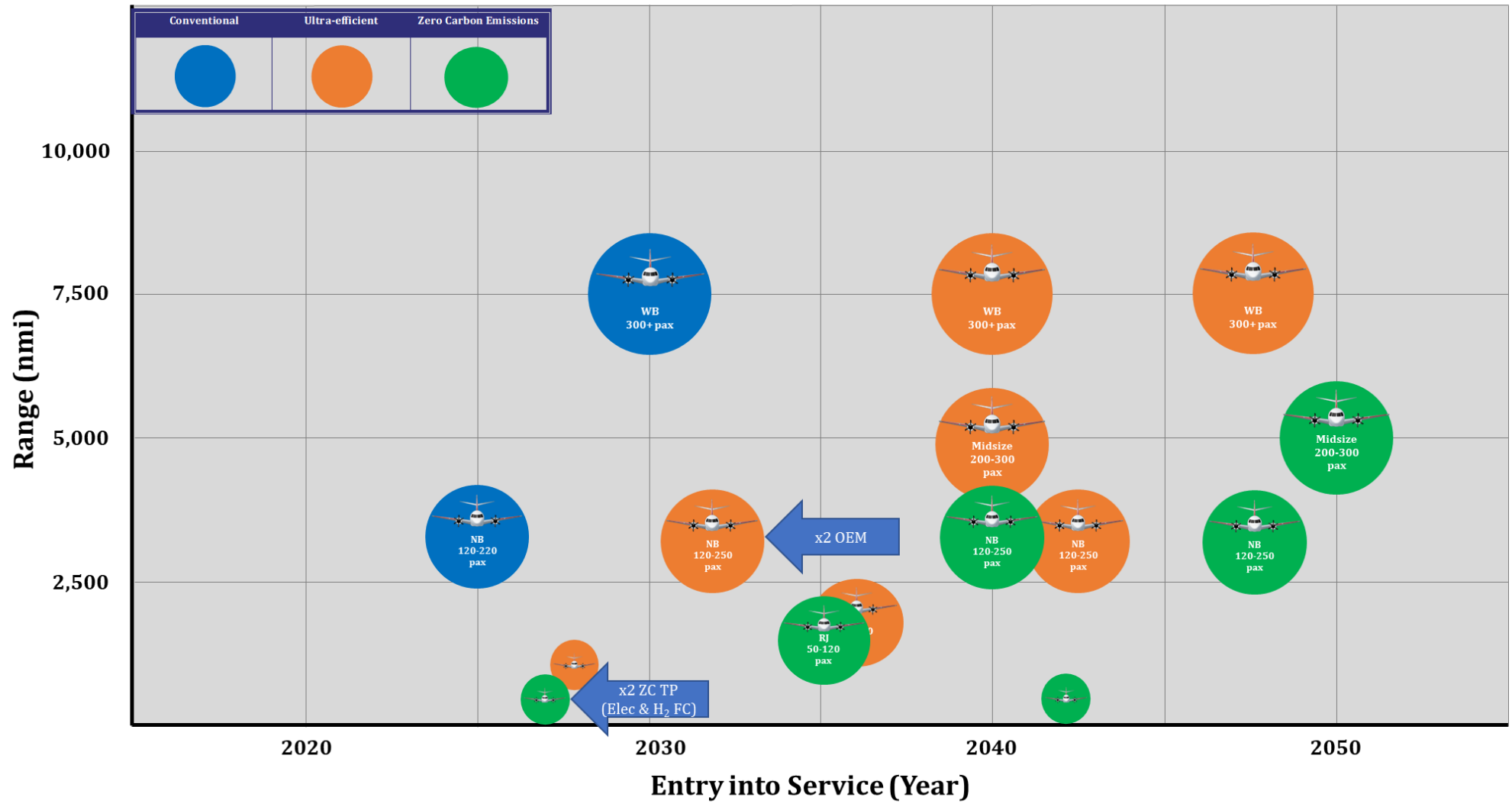


Figure 1: ATI Technology Strategy Market Baseline market penetration scenario

### 3.2. FlyZero Regional First Unaccelerated

This scenario is in line with the FlyZero *Regional First – Unaccelerated* scenario which assumes an unambitious drive for ZC aircraft adoption, thus resulting in later entry in service (EIS) and considerably slower transition of ZC aircraft globally. This scenario adopts a typical development path where the development of ZC aircraft is scaled up across the market class groupings, starting off with smaller regional TP and RJs then larger NB jets. The introduction of a ZC MS and/or WB jet is not expected before 2050. Furthermore, it is assumed that the passenger demand recovery and GDP growth forecasts are slightly slower than the other two scenarios. Figure 2 summarises the key market penetration assumptions.

- Ultra-efficient 100% SAF capable – The introduction of 100% SAF capable ultra-efficient NB aircraft is also assumed to occur in 2032 by two major OEMs, with an introduction by a 3<sup>rd</sup> OEM in the early 2040s. Similarly, it is anticipated that the two major OEMs introduce a MS and a WB ultra-efficient jet in 2040. A 3<sup>rd</sup> OEM is expected to introduce a WB ultra-efficient jet in the late 2040s.
- Zero Carbon –The fully electric and H2FC sub-regional TPs are still expected to be introduced in 2027. The introduction of a hydrogen-based ZC RJ is still anticipated for the mid-2030s. Due to the later EIS and slower transition towards larger ZC aircraft, the introduction of the first Hydrogen based ZC combustion NB jet by a major OEM is assumed to be pushed to the late 2040s. The other major OEM introduces a hydrogen-based ZC combustion NB approximately towards the end of the 2040s. Furthermore, given the delay into EIS of ZC aircraft, no ZC combustion MS or WB is expected to be introduced before 2050.

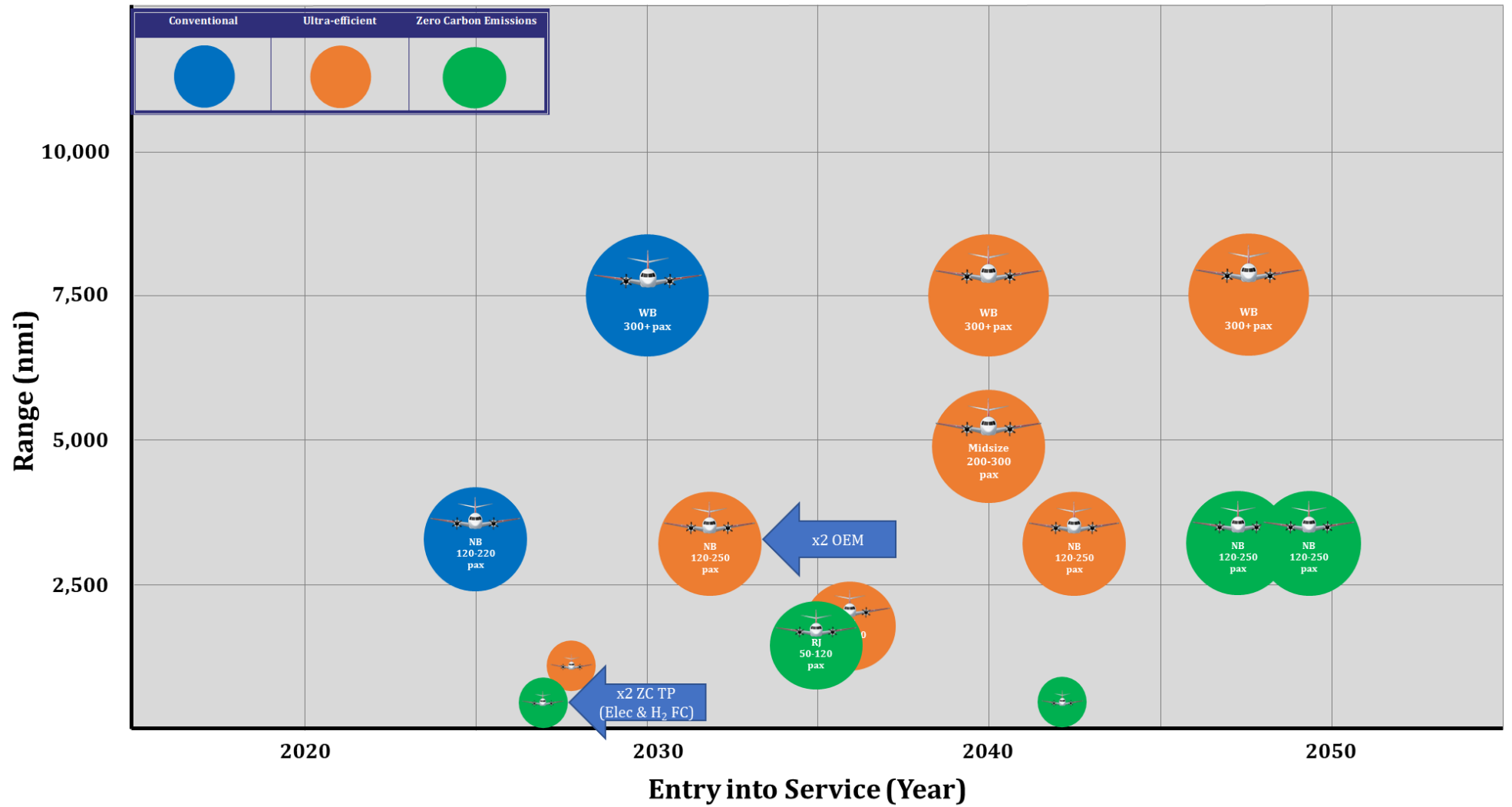


Figure 2: FlyZero Regional First Unaccelerated market penetration scenario

### 3.3. FlyZero Midsize First Accelerated

Aligned to the *FlyZero Midsize First – High Ambition*, this market scenario assumes a rapid transition towards ZC aircraft. A higher-risk development route is employed with the introduction of a ZC midsize jet as the first large ZC aircraft to address carbon emissions more aggressively. Furthermore, this scenario also assumes the introduction of a ZC hydrogen combustion WB jet before 2050, in contrast to the other market scenarios. The passenger demand and GDP growth forecasts are in line with the *ATI Technology Strategy Market Baseline Scenario*. Figure 3 illustrates the key market penetration assumptions aligned to this market scenario.

- Ultra-efficient 100% SAF capable – It is assumed that only one of the major OEMs will introduce a 100% SAF capable ultra-efficient NB aircraft in 2032 as the other shifts focus to a ZC Midsize jet. The 3<sup>rd</sup> OEM is still expected to introduce an ultra-efficient NB aircraft in the early 2040s. Furthermore, no ultra-efficient MS jet is introduced in this scenario. However, one of the major OEMs is expected to introduce an ultra-efficient WB jet in 2040, while the second major OEM shift focus on introducing a ZC WB aircraft. The 3<sup>rd</sup> OEM is still expected to introduce a WB ultra-efficient jet in the late 2040s.
- Zero Carbon –The ZC TPs introductions remain consistent with the other market scenarios and are scheduled for 2027. Given the highly ambitious path of development for ZC aircraft, the ZC RJ introduction is delayed to the early 2040s to allow for the introduction of a hydrogen combustion ZC MS aircraft by a major OEM in 2033. Furthermore, a ZC WB aircraft EIS is expected by 2040 by another major OEM. The single aisle market sees the introduction of two ZC narrowbodies by two major OEMs in 2037 and 2047 respectively.

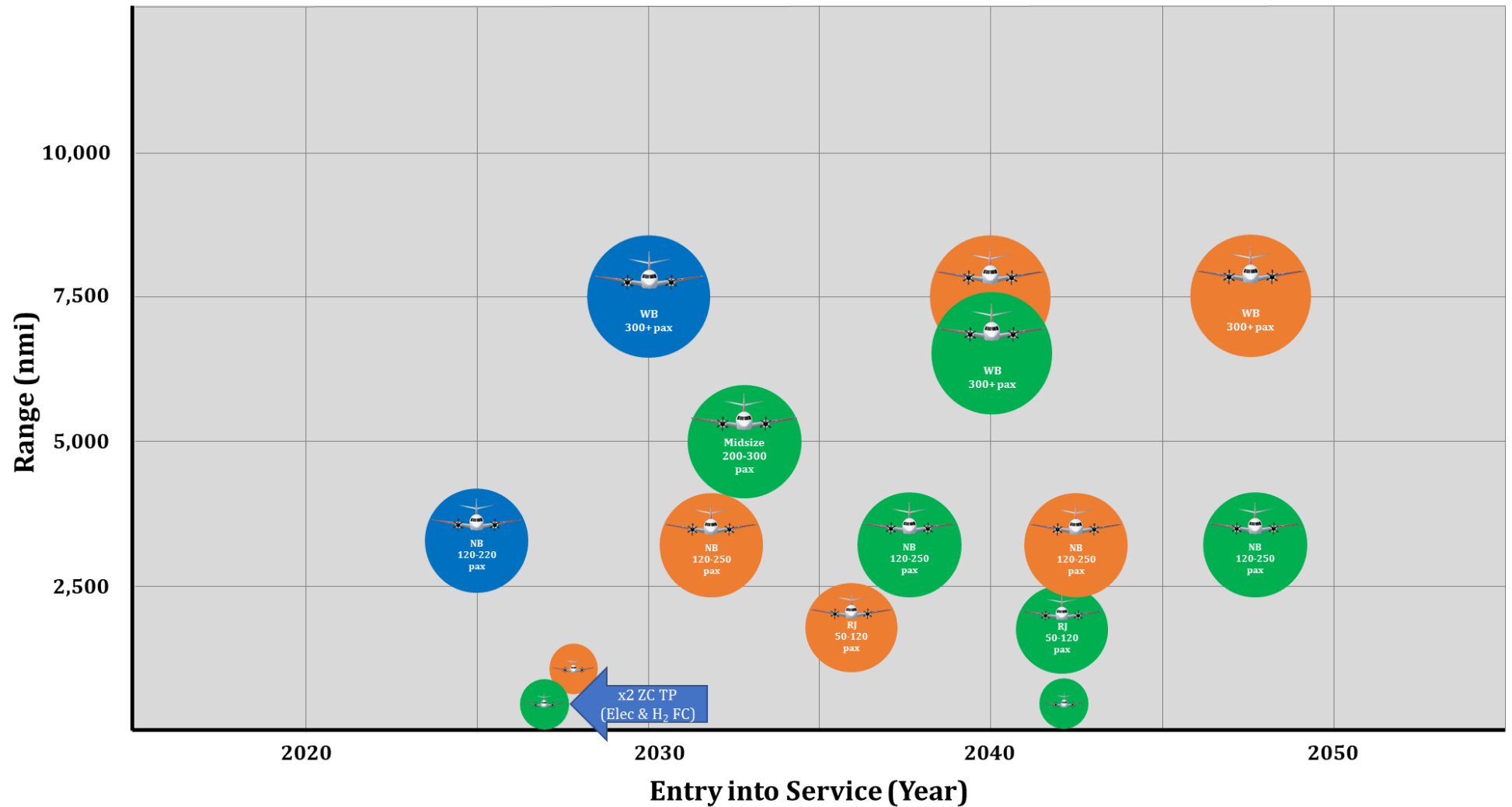


Figure 3: FlyZero Midsize First Accelerated market penetration scenario