

## The airlines' planes aren't vanishing

### *Executive Summary*

Pitkin County plans a half-billion-dollar redesign of Aspen Airport, starting with urgent and widely accepted improvements to safety, tower, terminal, and road traffic. The other and controversial part, explored in this series of documented essays, is redesigning the “airside” (where aircraft operate and park) to allow bigger, heavier planes that will supposedly be needed for several reasons. This essay treats the first reason; later essays will address the others.

The originally claimed need for airside redesign rests on a decade-old assumption that United's, American's, and Delta's current planes, the CRJ700 regional jets owned, maintained, and crewed by SkyWest, will retire in the next 2–7 years, requiring next-generation replacements too big for Aspen's current size restrictions. One or a few kinds of new planes may indeed be somewhat cleaner and quieter, but then current rules would also admit *other* airline and private planes that are dirtier and noisier than today's. In fact, a noisier jetliner with less summer capacity is now officially proposed to replace Delta's CRJ700s. These shifts' net effects on our community are unforeseeable and uncontrollable. But happily, *this whole dilemma is unnecessary*.

Its foundational CRJ700 retirement assumption, though believed by many citizens, evaporates on closer scrutiny. The original decade-old forecast, though still vigorously asserted by expansion advocates, is proving wrong by two or three *decades*: the CRJ700 fleet is in fact probably less than halfway through its practical operating life. It was forecast to be 50% retired by a year ago, 100% by 2025, but SkyWest through 2022 actually retired *zero*. These CRJ700s remain in brisk market demand, are highly suited to Aspen's unusual needs, and can reliably sustain its very lucrative commercial service as long as needed.

In an unannounced remark contradicting the County's longtime aviation marketing advisor, the County's top aviation technical consultant agreed in October “that the CRJ700 is going to be flying for the next 20 or 30 years—that it's not going away.” It's time for their dispute to come out from behind closed doors and for citizens to publicly examine the objective evidence summarized here. The planned nine-figure bet on who's right, risking airport users' and federal taxpayers' money, should be based on facts, not rhetoric.

Aviation operators don't retire older planes based on calendar ages or rules of thumb. They meticulously analyze specific planes in specific markets, choose the best, and safely fly older planes as long as they need to and can make a profit. Airplanes' rated lifetimes are often officially extended, even repeatedly. The CRJ700 is especially tough and reliable, so it's a strong candidate for safe life extension—and, many analysts agree, for resumed production now being seriously considered, probably with upgraded engines.

If CRJ700s' life *were* unexpectedly shortened, though, two modern alternatives provide an “insurance policy” to ensure uninterrupted airline service: the CRJ700's CRJ900 successor, and the quiet Dash 8-Q400 turboprop that provided excellent, comfortable, higher-capacity, and competitive service to Aspen during 2008–2016 (and has electric and hydrogen variants in development). The CRJ900 was artificially excluded from County studies by a descriptive error now acknowledged. The Q400 was excluded as not being a jet, or as phasing out of main airlines' US fleets. Yet it remains highly used and valued in the other 95% of the world market, with 1,160 units globally available, and it could readily return to Aspen if needed. That's until, as we'll show later, all these oil-fueled planes probably get displaced by superefficient, *fuel-free*, extremely clean and quiet new models, before the proposed Aspen Airport redesign could even be built. The prudent course is least-cost and least-risk: patience, fixing the rest of the Airport first.

## *Introduction*

Does Aspen Airport need to rebuild its airside to let in bigger airplanes? If so, why and by when? Where did that idea come from? Is it sound? And why does it matter?

Aspen Airport has what the Federal Aviation Administration (FAA) calls a Group D-III runway. Normally such a runway can accept any airplane that lands at a speed called D (below 161 knots) and whose size fits in Aircraft Design Group III (tip-to-tip wingspan less than 118', tail height below 45'). It must also be aeronautically able to fly safely in and out of Aspen Airport, whose tricky terrain needs steep descents and climb-outs, and enough agility so the plane can, for example, go around from a missed approach without hitting any "granite clouds."

But there's a catch: our Airport's particular size, topography, and other constraints make it hard to fit in the longest-winged Group III airplanes, so the FAA issued an exception called a Modification of Standard<sup>1</sup> based on an agreed Aspen ordinance restricting planes to 95' wingspans<sup>2</sup>. The County now proposes to remove that exception by relocating the taxiway farther from the runway so wingspans up to 118' won't cause passing planes' wingtips to collide. This would change many other aspects of layout on the constrained site. Contrary to a widespread public misconception, the 2020 decision to "leave the runway where it is"<sup>3</sup> doesn't mean the airside won't take bigger planes; it only means that the taxiway will move, not the runway. The runway would also be made wider (150', like Denver's) and stronger to take bigger, heavier<sup>4</sup> planes. The wider runway doesn't increase taxiway separation, which is measured between their centerlines.

The core of public disquiet about this proposed airside redesign is the dilemma eloquently summarized in the last section<sup>5</sup> of [ASE Vision's Common Ground Recommendations](#):

Some who support ASE becoming a full Group III airport [by eliminating the Modification of Standard] believe this would guarantee that other airliners would be able [to] serve our airport after the current CRJ-700 retires. Others fear that becoming a full Group III airport would invite much larger aircraft and result in a "cruise ship syndrome" that would irrevocably harm our community character, rural quality of life, and appeal as a unique destination resort.

If ASE were to become a full Group III airport, some of the new aircraft most likely to serve the airport would meet our community goals (reduction in noise, reduction in emissions and managed growth). The Airbus A220-100, for example, has only 9 more seats than the BA[e]146 that once served Aspen. The A220-100 emits substantially fewer greenhouse gas emissions than today's CRJ-700 and is also significantly quieter. In addition, the A220-100 is listed on the Fleet Forecast of planes that today's airlines say they'd like to bring to Aspen in the future.

On the other hand, another plane likely to serve a full Group III ASE is the Airbus A319-100. This aircraft is older, larger and heavier than the A220-100. In its landing and takeoff cycle, the A319 emits twice as much greenhouse gas per passenger as the A220-100. In fact, it emits more CO<sub>2</sub> per passenger than today's CRJ-700. The A319 currently in use is also noisier than either the CRJ-700 or the A220-100. And the A319, too, is on the Fleet Forecast list of planes the airlines would like to use for future Aspen service.

If we were to leave the airport as it is, we would run a distinct risk that no commercial jet airliner in the 50–76 seat range adequate for ASE's current level of service and passenger enplanements would be available to serve ASE when the CRJ-700 retires. We would also jeopardize FAA discretionary funding for the airport, and we would lose any chance of attaining our community air

pollution emission goals, our noise reduction goal, or our commitment to managed growth (~.8% per year) of commercial airline enplanements. Although, in theory, the Embraer E-175 could replace the CRJ-700, the E-175 is noisier, would have fewer seats due to performance issues, and would require more flights to move the same number of passengers. Its shorter range would also eliminate some cities served by today's CRJ-700.

In short, if we improved our airport to full Group III status, we would open the door to certain planes like the A220-100 that emit less greenhouse gas and other air pollutants, are quieter, and could attain our managed growth goal — but we would also invite larger, more polluting and noisier aircraft like the A319.

*These types of complex issues lie at the heart of why the Pitkin County-Aspen Airport has been such a source of seemingly endless community discussion for so long a time.*

This supposedly unavoidable dilemma flows from five basic assumptions:

1. The aging regional jetliners that now provide Aspen's commercial air service are about to retire and must soon be replaced—and the only suitable models are bigger.
2. The existing commercial planes spew too much carbon dioxide, air pollution, and noise, so they must soon be replaced by cleaner and quieter ones—but all the suitable ones are also bigger.
3. Anyhow, the Federal Aviation Administration is forcing Aspen Airport to upgrade to allow bigger planes; the current exception limiting them to 95' wingspan and 100,000 lb weight cannot legally continue.
4. Not upgrading to allow bigger planes will cause Aspen Airport to lose Federal grants and commercial flight service, crashing the economy. Previous FAA grants might even need to be repaid.
5. There is no alternative. Hemmed in by Federal regulations and slow-moving technology, we must act now to modernize Aspen Airport to accept bigger planes.

Those beliefs are widely propagated in our community. They underlie the official plans now being elaborated. Yet none of them is true. Reality is far more nuanced and dynamic. In fact, aviation is now undergoing its greatest revolution in history. Though some future details remain unclear, new trends now rapidly emerging could provide vital solutions not yet discussed.

This essay addresses assumption #1. Later essays will explore the other four. All five operate within the context that under the Airport's current operating rules regulated by the Federal Aviation Administration (FAA), the County cannot control which aircraft fly in and out. The County has no authority, and the operators have no incentive, to negotiate that. Choices among aircraft of FAA-approved size, weight, and aeronautical performance are made solely by aircraft owners, lessors, and operators, based on safety, fleet integration, performance, and economics—and assessed across many destinations, not just Aspen.

The evidence we offer below suggests that ASE Vision participants and County Commissioners were misled by a decade of obsolete information into endorsing Aspen Airport's expansion to let in bigger planes. *The CRJ700 fleet's retirement date was mis-forecast by about two decades.*

To be sure, in late 2020, dubious assumption #1 was deftly replaced<sup>6</sup> by assumption #2—a superficially attractive environmental rationale whose logic, as we’ll later learn, is equally unconvincing. But without assumption #1, it’s doubtful the ASE Vision process would even have been formed, let alone reluctantly recommended redesigning the airside for bigger planes.

Let’s therefore review how assumption #1 came to be the guiding premise, how its predictions compare with today’s reality, the actual lifetime and availability of Aspen’s current commercial planes, and what alternatives the County considered when deciding that none were suitable, so the only response to airline planes’ assumed imminent retirement was to convert the Airport to allow bigger replacements.

### *The imminent-retirement threat*

Although upwards of four-fifths of Aspen Airport’s takeoffs and landings are by General Aviation (GA) planes<sup>7</sup>, ASE Vision’s data and analysis focused almost entirely on the one-fifth or less that’s run by commercial carriers. Nearly all those airline flights<sup>8</sup> use a Canadian Regional Jet<sup>9</sup> called the CRJ700<sup>10</sup>—“the aircraft that started the regional jet revolution.”

“The stated impetus behind the ASE Vision process,” the *Aspen Daily News* reported in 2020<sup>11</sup>, “was the belief of many local officials and private consultants that the CRJ700 aircraft serving the local commercial market will be discontinued in the next two to 10 years, necessitating... airside improvements. A 20–1 vote in early March [2020] by the process’s dominating committee on ‘common ground recommendations’ for the airport’s redevelopment supported the contention that the CRJ700 is headed for retirement and that airside improvements are necessary to support next-generation jets.” But belief in CRJ700s’ rapid retirement has roots running back at least a decade—perhaps even to or before 1995, when local bond voters rejected bigger planes<sup>12</sup>, specifically including 737s, by 3:2. That political surprise may have spurred a more comprehensive and systematic process better calibrated to win public approval.

### *What our Commissioners and ASE Vision participants were told for a decade*

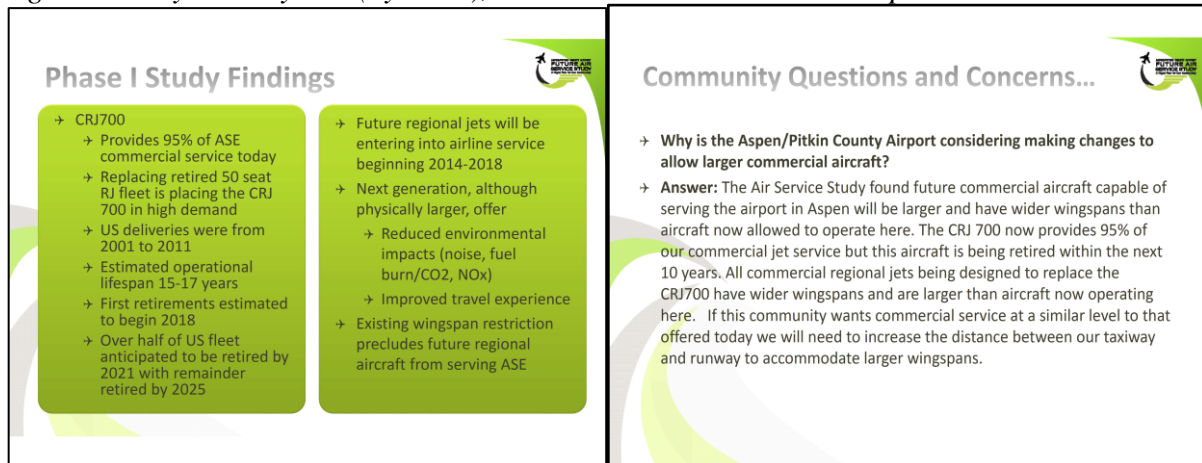
Let’s pick up the timeline in 2013 when the expansion push visibly accelerated, probably invigorated by the January 2011 appointment of a capable and astute County Manager:

**2013:** Phase I of the Future Air Service study reported to the BOCC<sup>13</sup> that the CRJ700’s anticipated useful life was 15–17 years (20 in the written report<sup>14</sup>), with “First retirements estimated to begin 2018” and “Over half of US fleet anticipated to be retired by 2021”. But “Operational restrictions [the wingspan and weight limits] preclude future regional aircraft from serving ASE,” threatening loss of commercial service if those restrictions weren’t removed by upgrading the Airport. That finding set the official narrative that has prevailed ever since.

**2014:** Phase II repeated that CRJ700s “will soon be retired from the fleet”<sup>15</sup>. Phase III reported to the BOCC (Fig. 1) that the CRJ700 “is being retired within the next 10 years”—“by 2025”—so “If this community wants commercial service at a similar level to that offered today we will need...to accommodate larger wingspans.” The new terminal was then planned to be built by 2021 and airfield expansion to allow bigger planes by mid-2022<sup>16</sup>—just in time to avert disaster

if the Commissioners moved ahead briskly. So advised, they fully approved the proposed expansion.

Fig. 1. Two slides<sup>17</sup> briefed in 2014 to the Board of County Commissioners by Jon Peacock and JD Ingram. The left slide (a 2012 finding) says US CRJ700s will be all gone by 2025, and the right slide says in 10 years (by 2024), with no available alternative operable under ASE's rules.



In case anyone missed the implied threat, the Community Questions slides spread by a half-million-dollar outreach campaign added that during the Environmental Assessment, “we as a community can seriously consider how development at the airport aligns with our values and [emphasis added] *whether maintaining regular commercial service operations at the airport is important to the community.*”

This ominous message had the desired effect: the Commissioners “listened to the new information [that over half the CRJ700 fleet would be retired by 2021] and then directed [ASE Director Jim Elwood] and the consultants from Aviation to move to the next phase” of studying ASE upgrading and engaging with the public. That launched the 2015–18 Environmental Assessment, which revealed a public desire for a wider process, leading in turn to creating [ASE Vision](#)<sup>18</sup>.

**2018:** A local newspaper featured the alarming claim<sup>19</sup> that without airside redesign, “the airport, under federal mandate, will return to turboprop jets that can carry 20 or so people only as far as Denver, according to officials”<sup>20</sup>. The stark choice presented between swiftly removing ASE’s 95’ wingspan limit and losing most or all airline service turned into a drumbeat, building momentum for the new airport design and the 118’ wingspans it would allow.

**2019:** Lacking access to contrary evidence, and facing the “prospect of possibly not having commercial aircraft available to service the needs of the community [, thus causing]...irreparable harm to its businesses and residents,” ASE Vision’s Technical Working Group reported to the Vision Committee that the “CRJ 700 is...being phased out by some airlines today, the last of which will likely be retired in the next 10–20 years...” with no currently ASE-compliant alternative. Based on that information and no independent check, the group’s majority preferred “the undesired impacts of...some mainline aircraft” to the risks of “likely degradation of commercial service into ASE” due to lack of alternative aircraft, and therefore recommended the airside expansion. This became the basis for the whole ASE Vision process’s conclusions.

The Vision Committee was reportedly<sup>21</sup> “told over and over again by consultants used by the county that there would not be a scope compliant... aircraft with a wingspan under 95’... ever built again. The CRJ 700... would be retired in a few years and is no longer available.” And on 15 October, the County’s aviation marketing advisor told the Technical Working Group<sup>22</sup> that “more and more signs are pointing toward the inevitable retirement of the CRJ700, perhaps sooner than previously thought.” By 20 December, however, the Technical Working Group’s final report (p 13) had slipped CRJ700s’ exit date by five years, to 2030–35, for “some additional airlines” but not necessarily all. Confidence in prompt retirement was starting to erode, but the prompt-retirement meme kept echoing among County citizens and elected representatives.

**2020:** On 12 May, the overarching ASE Vision Committee voted 20–1<sup>23</sup> to endorse the official plan. Its reported rationale<sup>24</sup> was still that “Airport and county officials, and their consultants, say the [CRJ700]... has a life expectancy of another two to 10 years before it will be completely phased out[—]the primary impetus behind” the expansion. The Common Ground Recommendations, based on no apparent analysis, simply adopted the qualitative notion they’d been told: “Since aircraft become more expensive to maintain as they age, and older planes are less fuel-efficient, it is our finding that airlines are likely to retire the CRJ-700 by or around the end of [this] decade.” That view, however, did not become more persuasive by repetition.

“Critics contended,” the reporter continued, “that the pro-expansion crowd has presented little evidence to support the contention that the CRJ-700 is going away soon. Consultants they’ve contacted say the aircraft could serve the local market through the end of the 2030s, and that the rush to push for a runway widening [and increased taxiway separation] is unnecessary.” Such criticisms were dismissed. On 17 August, the Aspen Skiing Company’s Director of Community Engagement wrote the County Commissioners that the CRJ700s’ retirement “is happening faster than expected,” citing Delta’s temporary winter suspension of service to Aspen, Hayden, and Montrose<sup>25</sup>. On 3 September, lawyer Barry Vaughan proclaimed<sup>26</sup>: “The 700 is going away. Maybe not this year, but soon. That’s a fact.”

Meanwhile, though, some others were starting to moderate rapid-retirement forecasts. On 15 September, ASE Vision leaders asked<sup>27</sup>: “Did the committee assume CRJ700 planes would retire? No, we found that airlines would likely use it for another decade”—yet they vaguely claimed rising maintenance costs that they implied, without analysis, would justify a half-billion-dollar County decision now to avert an average fleet age claimed to be 26<sup>28</sup> by 2030, “beyond the age when airlines normally retire smaller regional aircraft.” On 16 October, the County’s outside aviation consultants<sup>29</sup> became even vaguer, confirming CRJ700s’ significant further life and reframing retirement more as a customer preference for new equipment. (Such needs are normally handled by interior cosmetic refresh, not costly airframe replacement—especially under owners’ current financial stringency.) The County’s aviation advisors had become reluctant to commit their reputations to six-year-old forecasts that were looking increasingly dicey.

Conversely, on 10 November, the County’s aviation marketing advisor claimed that the 2014 CRJ700 retirement forecasts had been “off” because Bombardier and SkyWest hadn’t yet devised a floor-beam modification they later implemented to “breathe some additional life into that aircraft,” giving it “another decade or so” [i.e. to ~2030] for United and American<sup>30</sup>—a story

that one of the plane's original designers, on checking with Bombardier, was unable to verify. County consultants also continued to forecast CRJ700s' early retirement at least through 2019.

Nonetheless, in December the County Commissioners unanimously approved [Resolution 105-2020](#) setting Airport design policy. It would allow the proposed airside redesign for bigger planes if certain obscurely drafted conditions were met, depending on a new Fleet Mix Analysis and Airport Layout Plan to be completed over the next ~1½–2 years and now underway.

**2021:** The County launched a major analytic and planning effort. The new Airport Director aligned, saying the CRJ700's "time is coming to an end. It's an aging aircraft now. The last one was produced almost a decade ago. Over time, aircraft like that becomes a business decision for the airlines. Is it going to cost more to maintain it than they can make revenue from it? Can they get parts? Is it in the shop more than it's flying? They are starting to hit that point a little bit."<sup>31</sup> As far as we know, no technical evidence or economic analysis supporting that view has ever been presented.

**2022:** The consultants' retreat from those retirement forecasts unambiguously reversed such historic positions on 19 October in an invited technical Zoom discussion<sup>32</sup> with Amory Lovins and that same Airport Director. The forecaster for [replaces "expert leading the preparation of"] the County's new Fleet Mix Study and Airport Layout Plan told them all, with emphasis added, "I think everyone on this call here agrees that *the CRJ700 is going to be flying for the next 20 or 30 years—that it's not going away.*" Thus the myth was finally punctured, though without public disclosure. That discussion was to be briefed to the Airport Advisory Board the next day, but only its most general topic categories were mentioned with none of its content or implications<sup>33</sup>. AAB members are probably reading it here for the first time. Meanwhile, on 15 December 2022, the County's undeterred longtime airline liaison and marketer<sup>34</sup> assured them<sup>35</sup> that the CRJ700s will be gone in another 2–7 years<sup>36</sup>, to be gradually replaced by Embraer E175s.

If the County's top aviation consultant was right when he said on 19 October 2022 that the claimed 2–7 years is actually 20–30 years, then do the math: *20–30 years from 2022 means about 2042–2052, not 2025–30.* Yet it was the scary estimate of 2025 fleet retirement that induced the Commissioners in 2014 to authorize rebuilding Aspen Airport for bigger planes. If they knew then what the leader of their current Fleet Mix Study and Airport Layout Plan is saying now, they'd have had no reason to authorize the project, and there'd probably be no such plan today. Vital safety upgrades and terminal modernization would be underway, but with no perceived urgency for prompt airside redesign—just normal maintenance like runway renewal. If preparing for CRJ retirements takes a generous decade, the planners now have enough time to prepare not just once but two or three times in a row. Once suffices.

In short, the County's original loss-of-commercial-fleet premise, according to its own leading consultant, *has proved wrong by about two or three decades*<sup>37</sup>. What empirical data available from today's experience could better inform policy? Let's consider what actually happened to the CRJ700, then what we know about the CRJ700 airline fleet serving Aspen, then compare potential Aspen-flyable replacements and suggest some conclusions.



### *What actually happened*

On 13 December 2022, after the pandemic had largely passed, a granular global database showed that only 15 (4%) of the 347 CRJ700s ever built had been scrapped or destroyed<sup>38</sup>, while many were being briskly resold in the secondary market<sup>39</sup>. Of the surviving 332 CRJ700s, 212 (64%) were in service, 96 (28%) were parked awaiting their next assignment as operators shuffle their fleets, and 24 (7%) were stored or preserved. For a plane allegedly on the verge of extinction, that's very respectable operational health: reports of the CRJ700's death, or its chronic illness and costly disability, are greatly exaggerated. They are unsubstantiated rumors. They seem false.

At the end of 2021, the world's largest single CRJ700 fleet, with 114 planes<sup>40</sup>, was operated by SkyWest Airlines, which provides all Aspen airlines' planes and their maintenance and crews. (American Airlines was leasing 90 of those CRJ700s.) The County's consultants had originally forecast that half of all US CRJ700s would have retired by 2021, and all of them by 2025. In fact, as 2022 ended, SkyWest's CRJ700 retirements remained at *zero*<sup>41</sup> as the firm profitably operates these reliable assets.

To be sure, the CRJ700 is desired for two purposes: both ordinary operation (for its performance and economics) and conversions to roomier, VIP-segment, three-class 10+20+20-seat interiors called CRJ550s, introduced in 2019. Those conversions (50 initially<sup>42</sup>, followed by direct production of all-new CRJ550s) have won strong customer and airline praise<sup>43</sup>. Together with scope-clause<sup>44</sup> issues and a shift to point-to-point routes, they're helping keep CRJ700s in strong demand. In 2019, for example, United Express converted 20 CRJ700s<sup>45</sup> averaging 15 years old to CRJ550s for scope-clause flexibility<sup>46</sup> and a more Aspen-class customer experience,<sup>47</sup> while conversely, in October 2022, United Airlines bought 18 more CRJ700s (which Mesa Airlines had previously flown for United Express) to strengthen its own regional fleet<sup>48</sup>. United presumably expects all those CRJ700 airframes to run for many years to come. About how many years might that be?

### *Existing CRJ700s' operating life*

The working life of a commercial airplane type depends first on Federal Aviation Administration rules. FAA measures airframe life in cycles (defined by engine starts and landing gear cycles), not in years or flight hours. These metrics' relationship depends on mission and schedules. In service comparable to Aspen's, the CRJ700's current 80,000-cycle rating<sup>49</sup> should let it run far into the 2030s—"plausibly even into the 2040s. But this supposed limit isn't fixed, and indeed will probably rise," says one of its original designers and marketers<sup>50</sup>. That's because its rated life is very likely to be extended under standard industry protocols. For example, Norway's Widerøe Airlines extended its Dash 8-100 turboprops' rating from 80,000 to 120,000 cycles, then just engaged de Havilland Canada to extend it again to 160,000 cycles, to add "another 30 to 40+ years" to their operational life....<sup>51</sup> Other good planes can do this too.

Such extensions are neither mysterious nor unusual. They're standard industry practice for durable planes with a good long-term business case. Subject always to safety, certified life will be routinely extended, replacing life-limiting components as needed, until continuing to run the plane costs more than the total cost of replacing it—often a big lift for cash-strapped airlines.



Measured in years, *the CRJ700 fleet is now probably less than halfway through its life—before likely extensions*. Saying it’s about to retire is like saying that a person less than 32 years old—halfway from birth to nominal retirement age—is about to leave the workforce, so the search for a replacement must begin now. Such logic is just as foolish for airplanes as for employees.

Moreover, age is far from the most important driver of airlines’ complex fleet choices. Those depend on everything from demand and market forecasts to pilot shortages to fuel prices to scope clauses<sup>52</sup> to the complexity cost of adding new aircraft types<sup>53</sup>. Age does matter too, but counting years isn’t how airlines work: they rely on spreadsheets, not clocks or calendars. They scoff at generic rules of thumb. Instead, operators keep flying a safe and reliable plane as long as they need to and can make money with it<sup>54</sup>. Operators monitor each aircraft type’s economic prospects by analyzing costs and benefits, then unsentimentally retire losers and retain winners.

Their analyses would credit the CRJ700’s exceptional ruggedness and reliability. They’ll note the impressive performance of the same airframe’s military variant<sup>55</sup>, which an operator has reportedly called by far the most reliable, commercial, special missions aircraft they’ve ever operated. Its civilian version is considered “one of the toughest aircraft in operation,” so the FAA has twice extended its required maintenance intervals<sup>56</sup>. Such performance makes life extensions a more attractive investment.

Operators’ use cases compare costs with revenues and risks with benefits not in the abstract but *in specific routes and markets*. The CRJ700’s match to ASE’s unique needs happens to be very close. ASE is reportedly United Airlines’ third most profitable station worldwide<sup>57</sup> (no surprise at Aspen’s ticket prices), and the CRJ700 is probably the most site-suitable aircraft that has ever served Aspen. ASE is thus about the *last* airport in the nation that should fear losing CRJ700 service—all the more so because its relatively wealthy clientele is relatively insensitive to price. So long as that plane is safe to fly, it will keep flying until someone forbids it (which nobody wants to and the County currently can’t) or something better and cheaper *on Aspen routes* emerges. As an aviation expert deeply familiar with economic comparisons summarized<sup>58</sup>,

Aspen’s air routes are lucrative. Airlines will choose aircraft that can profitably operate here. Airlines that successfully operate a given type, currently the CRJ-700, will do so as long as they choose to. If the Aspen-Pitkin County Airport doesn’t allow a type or class of aircraft [which it currently lacks authority to do], airlines that want the Aspen market will neither try to fly it here nor abandon service here. This, too, is elementary, but apparently it needs repeating.

This logic raises confidence that ASE will never be stranded for lack of available commercial airplanes qualified to fly here. That’s just a baseless scare tactic. But does it matter that the CRJ700 is a mature design, not manufactured with its original interior for over a decade (though much newer CRJ550s offer the optionality to be converted back to CRJ700 interiors if desired)?

### *CRJ700s’ availability*

Much of the concern sometimes expressed about this model is it’s not new. Its original North American deliveries were in 2001–11. In 2020, its admired but undercapitalized Québec maker Bombardier sold its CRJ Series<sup>59</sup> to form Mitsubishi Heavy Industries Regional Jets (MHIRJ)—

partly so Mitsubishi Heavy Industries could acquire its well-established global Product Support network. Pitkin County’s aviation marketing liaison claimed in 2019 that this Japanese acquisition “most certainly represents the final nail in the coffin for Bombardier’s CRJ program along with any hopes that this aircraft or any derivatives might be resurrected.” However, in July 2021, the trade press reported<sup>60</sup> that MHIRJ is seriously considering restarting CRJ production, potentially including the 700 airframe. Our own industry sources confirmed in 2022 that this restart option is no longer speculative, and now the County’s consultants agree<sup>61</sup>. The business logic is clear.

Though Bombardier’s CRJ700 assembly facility in Montréal has been sold, nearby production space remains available, and market demand for such an airplane has resurged, making the business case attractive: as the 2021 reporter put it,

Production of the CRJ700 may be restarted for use by the USA’s SkyWest Airlines in a CRJ550 configuration.... Restarting CRJ production gives MHI the ability to proceed with an aircraft that already is certified, by Canada, [the US, and many other certifying agencies around the world], at much lower cost....Restarting production with the CRJ700, even if in the CRJ550 [interior] configuration, gives MHI the ability to offer the 700 and the larger CRJ900 for sale, should it choose.

A customer would simply order the same airframe equipped with the 700 rather than 550 interior. Another industry commentator noted<sup>62</sup> that

...a lot of existing users of CRJ700[s]...wanted to replace them with Mitsubishi’s Space Jet. And with the latter perhaps out of the picture for good [suspended if not cancelled outright], there seem to be calls for reviving the CRJ700....And it seems SkyWest is “courting” Mitsubishi, to set up production once again.

Resumed CRJ700 production would of course moot the retirement argument. The next essay in our series will explore why the CRJ700 is likely to be displaced not by bigger oil-burning planes as officially assumed but by new types that burn nothing and emit nothing except perhaps water.

Of course, new CRJ700s would need to compete with Embraer’s E175. That’s a decent and popular plane *in many other markets*; thus in 2018, when United was flying 190 E175s and 65 CRJ700s, it bought 25 more E175s to replace CRJ700s. But in some important markets, including ASE, the CRJ700 remains economically and functionally superior. As the 2019 Fleet Forecast found, the CRJ700 is lighter, quieter, and less polluting. Its advantages would rise if, as expected, restarted CRJ700 production were up-engined with a more powerful model already available. This would not require recertification of the airframe—only of the engine for specific use on the CRJ700. But upgrading the E175’s current engines, which underperform in Aspen’s summer hot-and-high conditions, *would* require recertification of both engine and airframe, adding cost and delay. The E175’s improved E2 variant has been twice postponed—in February 2022, until at least 2027—and its ultimate production is not assured<sup>63</sup>. Its bigger engines also tipped its weight beyond what scope clauses allow (to be re-discussed in 2024), so “SkyWest... holds an order for 100 E175-E2s that are unlikely to see service under current regulations.” That’s the same issue that killed the CRJ1000’s market<sup>64</sup>.

All analyses agree that the E175's marginal hot-day performance at ASE would cause many denied boardings and baggage offloads. When Delta runs its few Aspen flights only in winter, it doesn't care about summer performance, but United and American, ASE's dominant year-round operators, would resist, because the E175 is simply not well suited to ASE's conditions. As the Aspen Skiing Company, agreeing with ASE Vision (p. 1 above), told the BOCC<sup>65</sup>:

The status quo would mean the Embraer E-175 is the only assured replacement for the CRJ-700. That would result in going backward on every one of [ASE Vision's]...Common Goals. The E-175 is the noisiest plane among the fleet options, and it is more polluting when you consider it would likely be subject to payload restrictions and therefore require increased operations to cover the same passenger volume as the CRJ-700. That would require many more landing and take-off cycles, which add to global GHGs [greenhouse gases]. It's far worse than today. And because the E-175 would unlikely be able to reach the same number of non-stop destinations, it would likely increase Netjets-type GA.

The BOCC was told in late 2020 that there is no alternative jet capable of serving ASE as now configured<sup>66</sup>, except the noisier and summer-challenged E175, which we didn't propose but the Airport seems eager to try. In January 2022, its Airport Director even declared that the E175 is "the only option [in the pipeline]...Nothing else is feasible to replace the CRJ-700"—and strangely announced it as Aspen's long-awaited "replacement airplane"<sup>67</sup>. Yet substantial uncertainties remain about its aeronautical and economic performance in Aspen, and their resolution cannot be assured. Nor is the E175 necessarily optimal in all other respects. It does not appear to satisfy the BOCC's Resolution 105-2020 [requirements](#) (preface to Goals 12–15). And on 30 December 2022, United announced that to comply with scope clauses in the United Pilot Contract, it would park up to 38 E175s serving other routes in favor of flying Mesa Airlines' CRJ900s instead<sup>68</sup>.

*No rush, no worries*

It's therefore very good news that two *other* excellent, current-technology alternative planes<sup>69</sup> are Aspen-qualified *today* and could serve for at least another 1–3 decades plus life extensions with no airside redesign. Both types were artificially rejected throughout previous County studies, and those methodological errors should finally be corrected:

- The CRJ700's bigger and newer cousin is the ~90-passenger CRJ900. The County's aviation consultants finally admitted<sup>70</sup> in 2020 that it *does* meet ASE's technical requirements, which eight years of their studies had claimed it failed. (They'd misdescribed an economic comparison as if it were a technical or safety need, and had misframed its relevance.) The County's aviation marketing advisor said SkyWest for Delta and Mesa for American had considered the CRJ900 for Aspen and were not "comfortable" with it<sup>71</sup>, but it's not clear why: that could be another confusion between economics and operational safety. It's no substitute for the technical assessments conducted for other aircraft types by the County's airspace consultant Lean Engineering. (He also implied the CRJ900 lacks the "performance" to fly into Aspen, but County consultant Alec Seybold had already denied that in a BOCC brief saying the opposite of what the aviation marketing advisor had claimed<sup>72</sup>.) At the very least, the CRJ900's suitability needs careful assessment by independent aviation analysts<sup>73</sup>.

- The BOCC also heard<sup>74</sup> that the 74–78-seat Dash-8 Q400 turboprop<sup>75</sup> (Q for “quiet”) “isn’t really available.” It’s readily available on the secondary market, and was produced as recently as a year ago. Production is planned to resume once the factory relocates as its lease expires. Meanwhile, both electric and hydrogen versions are in development with strong partners<sup>76</sup>. The Q400 offers some significant operational advantages over jets, including full summer payload capability. It has the range to serve all current destinations except currently Atlanta<sup>77</sup> (for which Delta has reportedly nominated the E175 anyhow). It’s more efficient and hence less CO<sub>2</sub>-emitting than the E175<sup>78</sup>. It proved popular, reliable, and competitive serving ASE for eight years until 2016. ASE Vision’s Technical Working Group operational ranking had it tied for #1, less sensitive to hot weather than the CRJ700, and quieter by two of three metrics. Yet all County studies rejected it<sup>79</sup>, and the County’s aviation marketing advisor just said its last US airline customer, Horizon / Alaska, will retire its 18 planes on 8 January 2023, so that’s “the end of the line for the Q400<sup>80</sup>.” That’s a strange interpretation. Horizon’s local situation, like Delta’s for the CRJ700, is a parochial distraction that doesn’t define or constrain Aspen’s options—least of all as a durable “insurance policy.” The remaining US market for the Q400 is only about 5% of its lively *world* market; Canadian carriers alone currently fly more than 175 Q400s. Aspen’s carriers could readily lease Q400s from the 1,160-strong fleet globally available<sup>81</sup>, renew training, and return it to ASE service if they needed to.

In short, the CRJ700 remains valid and valuable for upwards of two decades more, and it has at least two sound alternatives with similar or longer operating lives. We wonder why both those alternatives apparently continue to be overlooked. It’s hard to avoid the inference that acknowledging their solid “insurance” against unexpectedly early CRJ700 retirement would destroy the most thoroughly propagated argument for a prompt ASE upgrade to accept bigger planes.

### *Conclusions*

Aspen can count on long-term CRJ700 service, CRJ900 and Q400 “insurance policies,” and even a E175 option if it proves feasible, *all without changing the airside design*. Thus the claim that the specter of CRJ700 retirements forces a costly redesign now to allow other, bigger, “next-generation” planes—letting in all their disagreeable cousins too—isn’t true, and never was.

If the CRJ700 can continue to serve Aspen into the 2040s or beyond as the County’s top aviation technical advisor now says—contrary to SkiCo’s 2020 and the aviation marketing advisor’s 2022 belief—then ASE should *not* convert the airside for bigger regional jets, because they won’t be needed. Whether or not the E175 is the CRJ700’s only qualified alternative, and even if it’s not as inferior as SkiCo now says, we won’t need it either, though Delta may try to use it for its few Aspen flights because it has many E175s, and Delta’s Aspen focus is on winter service when the E175’s summer inadequacy wouldn’t matter.

The only issue is then whether the CRJ700 is ephemeral or durable. The planned airside expansion is a nine-figure bet that the CRJ700 is about to go away, *and* that the already Aspen-qualified CRJ900 and Dash 8-Q400 alternatives aren’t available, *and* that the E175 can’t help, *and* that the ultraclean replacements described in our next essay won’t leapfrog all these types anytime in the next 2–3 decades (let alone in this decade). That’s a five-layered bet between two

people in whom the County evidently reposes much confidence. Surely such a basic dispute between two prominent advisors merits a full, deep, and open search for solid evidence, rather than just picking whichever opinion fits a desired outcome or defends a long-held belief.

Perhaps the best of the bigger “next-generation” planes for which the County would like to rebuild the airside is the Bombardier-designed ~100–120-seat Airbus A220. This excellent airplane, with fine support from the same source as the CRJ700s, would be superior to them in some respects—if its benefits weren’t offset by, say, A319s that could also fly into an airport upgraded to allow the A220. But the A220’s improvements hardly seem worth a nine-figure airside upgrade investment that Federal taxpayers and airport users would have to pay for, and the *net* benefits from, say, cleaner and quieter A220s offset by an unknown influx of dirtier and noisier A319s and perhaps 737s can’t be predicted. That’s the dilemma of airside expansion that ASE Vision summarized on the first page of this essay.

As we’ll see later, even greater aircraft improvements are very likely to be available sooner and at much lower total cost (which could include avoiding the \$170-million-plus-inflation airside rebuild) from rapidly emergent planes far cleaner and quieter than the A220. It therefore also looks very likely that our County Commissioners’ goals for a cleaner, quieter airport can be not just met but greatly surpassed by planes that fit the current airside and that will quickly come to market *whether or not* that airside is reconfigured. Thus while fixing the rest of the Airport—safety, tower, terminal, traffic—this community just needs its Commissioners to wait patiently for the aviation revolution to keep unfolding. Then Aspen can adopt and integrate many kinds of new opportunities not previously analyzed, but explained in this series. That patience can capture system benefits much greater than the sum of the parts, as we’ll explore.

Meanwhile, there’s no rush. The CRJ700s are not about to disappear in this decade, nor the next, nor probably even the next. They’re available for as long as necessary. They can be safely, reliably, and economically used until the operators prefer a superior replacement that makes sense, makes money, and fits the current airside design. That replacement may well be fuel-free—probably a decade sooner than expected, as we’ll explore next week.

Keep calm and carry on.

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<sup>1</sup> FAA prefers to avoid or eliminate such exceptions if that is safe and practical to do at reasonable cost in local circumstances, but has no draconian mandate. Some elements of ASE’s current MoS are not practical to remedy, such as having a flat runway instead of ASE’s unavoidably sloped runway, which drops 158’ over its 8,006’ from S to N. The most important MoS issues are the runway/taxiway separation, runway width, and wingspan limit. We’ll examine some alternatives in this and later essays. Pitkin County has published a helpful summary of the wingspan issue at <http://www.aspenairport.com/wp-content/uploads/2020/09/Meeting-5-ASE-Wingspan-Restriction-Briefing-Paper-March-2014-PDF.pdf>.

<sup>2</sup> Fitting their respective responsibilities and authorities, FAA as the airport safety regulator granted the Modification of Standard on condition local government adopted the ordinance. On 31 March 2022, FAA adopted rule change [150/5300-13B](#), which may relax separation requirements and somewhat increase design flexibility. The County’s consultants are doubtless evaluating this.

<sup>3</sup> J. Auslander, “Aspen airport runway should stay put, Pitkin County commissioners say in 4–1 vote,” *Aspen Times*, 30 Oct 2020, <https://www.aspentimes.com/news/aspen-airport-runway-should-stay-put-pitkin-county-commissioners-decide-in-4-1-vote/>.

<sup>4</sup> Landing weight may depend on fleet mix and operations, but would rise to at least 140,000 lb from today’s 100,000 lb.

<sup>5</sup> P 13, §9, “The Complex Core Issues Facing the Pitkin County-Aspen Airport,” in *The Final Report of the Airport Vision Committee—The Common Ground Recommendations*, 16 April 2020, <http://aspenairport.wpenginepowered.com/wp-content/uploads/2022/04/ASE-VC-Final-Recommendations.pdf>. Emphasis in original.

<sup>6</sup> Observers of the BOCC deliberations could reasonably conclude that this shift reflected lack of a majority for simply proceeding with an ADG-III design.

<sup>7</sup> Details are documented in this series’ essay #3, “Runway Robbery?,” 29 Dec 2022, [https://aspenflyright.org/wp-content/uploads/2022/12/ABL-essay\\_3.-FBO\\_dr21\\_29-Dec-2022.pdf](https://aspenflyright.org/wp-content/uploads/2022/12/ABL-essay_3.-FBO_dr21_29-Dec-2022.pdf).

<sup>8</sup> In 2018, 95% ([Future Air Service Study Phase III outbrief 2018.pdf](#), p 19). SkyWest Airlines (St. George, Utah) provides the planes, maintenance, and crews for Aspen’s airline services, which put their own names and livery on them. SkyWest says United Express uses

CRJ700's 70-seat, Delta Connection its 69-seat, and American Eagle its 69-seat variant (<https://www.skywest.com/about-skywest-airlines/aircraft>, downloaded 10 Dec 2022).

<sup>9</sup> An overview is at <https://mhirj.com/en/products-and-services/crj-series>. The CRJ series is "the world's most successful regional aircraft family." In 2020, more than 1,900 served 120+ operators in 90 countries, and one took off or landed every five seconds. CRJs made 20% of all 2015 North American jet departures, with the 60–100-seat global market in 2018–37 projected (pre-pandemic) to total about 5,500 airplanes. Within that family of airframes, the CRJ700 nicely fits and can serve Aspen's very specific needs several times longer than a generous estimate of how long it could take to upgrade the airside. The emergent pandemic-reinforced shift from hub-and-spoke toward point-to-point routes is even starting to attract some giant operators that value hub-and-spokes oligopolies: in 2020, United announced its biggest-yet expansion into point-to-point routes (S. Miller, "Damn the hubs; nonstop flights ahead for United," 13 Aug 2020, <https://paxex.aero/2020/08/damn-hubs-nonstop-flights-united/>), which Aspen passengers love and which can cut greenhouse gas emissions by replacing two trips with one:

<sup>10</sup> Description, images, and specifications are at the CRJ700 tab at <https://mhirj.com/en/products-and-services/CRJseries>. MHIRJ is Mitsubishi Heavy Industries Regional Jets, which bought the CRJ Series Program from Bombardier in 2020. It describes the CRJ Series (with 50, 70, 86, and 100 seats with numerous variants) as "the world's most successful regional aircraft family for the last three decades." Over 1,300 CRJs of all sizes are now in operation. A 2005 technical summary is at [https://resources.globalair.com/specs/aircraftbrochures/4347\\_CRJ-700%20brochure.pdf](https://resources.globalair.com/specs/aircraftbrochures/4347_CRJ-700%20brochure.pdf).

<sup>11</sup> A. Salvail, "Lovins' Aspen airport redevelopment process should be put on pause," 31 Aug 2020, [https://www.aspendailynews.com/news/lovin-aspens-airport-redevelopment-process-should-be-put-on-pause/article\\_c5548fa4-eb39-11ea-a7ac-979475c7129d.html](https://www.aspendailynews.com/news/lovin-aspens-airport-redevelopment-process-should-be-put-on-pause/article_c5548fa4-eb39-11ea-a7ac-979475c7129d.html).

<sup>12</sup> Pitkin County's 1995 vote rejected, 2,824 to 1,883 (3:2), a \$1.9-million airport revenue bond issue to widen and strengthen the runway to accept bigger planes, and required a second vote before allowing 737 or similar planes to operate at ASE. The same voters had previously approved runway improvements, but evidently wanted better service without bigger planes (especially 737s). The vote is mentioned on p 3 of the ASE Vision *Technical Working Group Final Report* (<https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/Meeting-7-Final-Technical-Working-Group-Report-and-Recommendations-PDF.pdf>), but is not in other County-posted Airport documents we can find.

<sup>13</sup> BOCC 19 Nov 2013 meeting, Mead & Hunt's last four slides, <https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/BOCC-Meeting-Future-Air-Service-Study-Phase-1-Presentaion.pdf> [sic]. The written report at p 10 says in boldface that "the CRJ-700 is in high demand and will be approaching its limited flying cycle sometime in the next decade," i.e. in the 2020s ([https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1\\_Part1.pdf](https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1_Part1.pdf)).

<sup>14</sup> Mead and Hunt, *ASE Future Air Service Planning Study, Phase I*, 15 Nov 2013, p 13, [https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1\\_Part1.pdf](https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1_Part1.pdf).

<sup>15</sup> Aviation, *Future Air Service Planning Study Phase II*, pp 1 & 6, 24 June 2014, [https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1\\_Part1.pdf](https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/ASE-Future-Air-Service-Planning-Study-Phase-1_Part1.pdf)

<sup>16</sup> "ASE Potential Project Schedule," <http://www.aspensairport.com/wp-content/uploads/2020/09/ASEairsrvstudyPhIIIBOCC12-16-14FINAL.pdf>.

<sup>17</sup> ASE Future Air Service Planning Study Phase III BOCC Work Session, 16 Dec 2014, deck from Ref. 16.

<sup>18</sup> As the Technical Working Group's report described the connection in its Final Report (p 4): "One of the concerns expressed by members of the public about the EA process was that it didn't allow for the full scope of conversation about proposed airport improvements that are expected by residents of Pitkin County. To address these concerns, Pitkin County initiated a comprehensive community engagement process beginning in February 2019 to help establish a vision for the future of Aspen/Pitkin County Airport. This vision will define airport modernization and improvements for the next 30 years."

<sup>19</sup> C. Abraham, "The Future of Flight in Aspen," *Aspen Daily News*, 19 Aug 2018, [https://www.aspendailynews.com/news/the-future-of-flight-in-aspens/article\\_548a2c3e-a351-11e8-a4ed-e3017be8c5c5.html](https://www.aspendailynews.com/news/the-future-of-flight-in-aspens/article_548a2c3e-a351-11e8-a4ed-e3017be8c5c5.html).

<sup>20</sup> This apparently assumed that the FAA would downgrade the Airport from its current rating—Class 3 with Modification[s] of Standard—to Class II.

<sup>21</sup> V. Braun, Minority Report, ASE Vision Committee Recommendations, 16 Apr 2020, <https://aspensairport.wpenginepowered.com/wp-content/uploads/2020/09/Work-Session-10-Agenda-and-Board-Packet.pdf>, at A5 (p 41). (This Minority Report, like others from the subordinated working groups, is not in the County's standard posting.) At p 62, Ms. Braun asks that "the offered briefing from Mitsubishi" on CRJ700 lifetime be allowed. It apparently was not.

<sup>22</sup> In the interesting undated deck "The Graveyard of Commercial Airliners at ASE: Life Expectancy of the CRJ700," <http://www.aspensairport.com/wp-content/uploads/2020/09/Meeting-4-Graveyard-of-Commercial-Airliners-of-ASE-PDF.pdf>. His evidence was that Delta said "they would like to accelerate the retirement of their remaining CRJ700's" (citing but not addressing the content of Delta's complex consolidation of its three regional carriers (<https://theaircurrent.com/airlines/unraveling-the-dynamics-behind-deltas-regional-airline-consolidation/>), or mentioning that Delta can fly E175s into ASE by operating only in the winter when their inadequate hot-summer-day payload is irrelevant); and that United ordered 20 E175s and optioned 19, without mentioning that United sustains a strong CRJ700 fleet on routes it profitably serves, of which ASE's are among the top profit-earners.

<sup>23</sup> See [here](#) for background on that process and vote.

<sup>24</sup> A. Salvail, "ASE Vision critics undeterred," *Aspen Daily News*, 12 Mar 2020, [https://www.aspendailynews.com/news/ase-vision-critics-undeterred/article\\_0bde4e8a-640b-11ea-8362-9f690b788ca2.html](https://www.aspendailynews.com/news/ase-vision-critics-undeterred/article_0bde4e8a-640b-11ea-8362-9f690b788ca2.html).

<sup>25</sup> Airline liaison and air travel marketer Bill Tomcich echoed him in a 26 August 2020 *Aspen Daily News* article. But Delta's behavior was logically ascribable not to the aircraft type—fully allowed and functional—but to the need to redeploy three planes to more-profitable routes as Delta drowned in red ink (2Q20 vs. 2Q19 sales down 88% with \$5.7 billion losses, and planned 3Q20 capacity down at least 75%). That was about airline survival, not aircraft type, and Delta was already consolidating three regional services and realigning their fleets (<https://www.wsj.com/articles/delta-trims-flying-amid-coronavirus-pandemic-11594725393>). Its trims mirrored industrywide patterns amid the pandemic aviation carnage of 2019–21: American Airlines, for example, had just [suspended](#) 15 US rural markets as CARES Act funding expired. Even in March 2022, SkyWest in United Express livery petitioned to exit 29 small cities including Alamosa (R. Silk, 20 Mar 2022, <https://www.travelweek.com/Travel-News/Airline-News/SkyWest-intends-to-exit-29-small-cities>).

Thanks to the assiduous efforts of marketers like Mr. Tomcich, Aspen's flight arrangements have held up well: J. Blevins, "Colorado's mountain airports are thriving despite national rural air service struggle," *The Colorado Sun*, 2 Aug 2022, [https://coloradosun.com/2022/08/02/colorado-mountain-airports-busy-2022/?picoclean&utm\\_source=The%20Colorado%20Sun%20Newsletters&utm\\_campaign=SUNRISER\\_20220802&utm\\_medium=email](https://coloradosun.com/2022/08/02/colorado-mountain-airports-busy-2022/?picoclean&utm_source=The%20Colorado%20Sun%20Newsletters&utm_campaign=SUNRISER_20220802&utm_medium=email).

<sup>26</sup> "Lovins' criticisms unfounded," *Aspen Daily News*, 11 Dec 2022, [https://www.aspendailynews.com/opinion/letters\\_to\\_editor/lovin-criticisms-unfounded/article\\_b0982c18-ed7f-11ea-85c1-774d441b2e36.html](https://www.aspendailynews.com/opinion/letters_to_editor/lovin-criticisms-unfounded/article_b0982c18-ed7f-11ea-85c1-774d441b2e36.html); "Don't delay Aspen-Pitkin County Airport improvements," 23 Sep 2020,



Aspen Daily News, [https://www.aspendailynews.com/opinion/don-t-delay-aspen-pitkin-county-airport-improvements/article\\_5194c82a-fd29-11ea-880a-7f0aa5ddf47f.html](https://www.aspendailynews.com/opinion/don-t-delay-aspen-pitkin-county-airport-improvements/article_5194c82a-fd29-11ea-880a-7f0aa5ddf47f.html).

<sup>27</sup> J. Bennett, M. Haynes, & J. Francis, “Our future airport: A worthy vision,” *Aspen Times*, p A16,

<https://edition.pagesuite.com/html5/reader/production/default.aspx?pubname=&edid=72bb820d-b355-4e25-917f-33120380554d&pnum=16>.

<sup>28</sup> In contrast, in 8 Sep 2020 comments to the BOCC, attached to their 6 Oct 2020 Work Session packet, Ellen Anderson wrote: “On September 4, 2020, Nathalie Scott, Senior Advisor, Public Relations and Media of Mitsubishi Heavy Industries (the manufacturer of the CRJ-700), stated in an e-mail “The Design Life of a CRJ700 is 80K Flight Cycles. FYI, The average age of the approximately 240 CRJ700s in service in the US as of January 2020 was 14 years old...which is still pretty young. Hope that clarifies.” Further, a near-real-time aviation database queried on 10 December 2022 (<https://www.planespotters.net/airline/United-Express>; individual-plane data at tabs 5–6) reported that United Express has 567 aircraft, plus 11 planned or on order, including 52 in-service CRJ700s (plus 25 parked and 10 future) compared with 51 historic. The CRJ700s’ average age was reportedly 16.9 years. Individual ages reported for the SkyWest-owned CRJ700s ranged from 12.9 to 17.8 years, averaging 13.2 years with a standard deviation of 0.24 years—1.2 years younger than the average for the total United Express airplane fleet<sup>28</sup>. To summarize, widespread statements in 2019 that the CRJ700s must soon retire assumed that this type’s “fleet averages 15–16 years old”, corresponding to ~18–19 years in late 2022 and apparently referring to all CRJ700s in the US or perhaps in the world; the ASE Vision leaders’ estimate of 26 years in 2030 would correspond to 18 years in 2022; and the manufacturer’s datapoint of 14 years for in-service US CRJ700s in Jan 2000 implies ~17 years in Dec 2022. However, the Planespotters 10 Dec 2022 age data average 13.2 years for SkyWest-owned CRJ700s, including those that serve Aspen, suggesting a potential discrepancy big enough to be worth resolving: the planes serving Aspen may be ~5 years younger than assumed from averages of larger populations.

<sup>29</sup> At BOCC meeting, minutes 58–62.

<sup>30</sup> Bill Tomcich at 1:01:45–1:02:12 in the 10 Nov 2020 BOCC hearing at the Hotel Jerome, <https://www.pitkincounty.com/374/County-Webcasts>.

<sup>31</sup> *Aspen Daily News* interview, 24 July 2021, [https://www.aspendailynews.com/news/new-aspen-airport-director-says-he-welcomes-challenge-of-dealing-with-future-improvements/article\\_9d24a446-ec28-11eb-a693-979ac2c40d5c.html](https://www.aspendailynews.com/news/new-aspen-airport-director-says-he-welcomes-challenge-of-dealing-with-future-improvements/article_9d24a446-ec28-11eb-a693-979ac2c40d5c.html). We have no indication that the operators’ sharp-penciled analysts share his hypothetical concerns. Perhaps he has also since learned more from his consultants (Refs. 32 and 61).

<sup>32</sup> At [https://drive.google.com/file/d/1I8-LR-uA6jvN0yRs-VERgB\\_m9FMGfuzj/view?usp=sharing](https://drive.google.com/file/d/1I8-LR-uA6jvN0yRs-VERgB_m9FMGfuzj/view?usp=sharing), starting at 2:33:39. The quoted remark is at 2:34:15. The speaker, William Flock, is listed as “Director” on the Jacobsen | Daniels website, and was identified (at 40:11 of <https://drive.google.com/file/d/10vyIQ-p1MLLCQ9CXdyAs4kn8W4dg1tSO/view>, 20 April 2023 brief to AAB) as “the forecaster” by Jacobsen | Daniels co-owner and ALP / Fleet Mix Study Project Manager Brad Jacobsen. We erroneously attributed the quotation to Mr. Jacobsen and have posted a correction. We did not correct references to “the County’s top aviation technical consultant” that did not name a person, because that consultant is the firm Jacobsen | Daniels. Please see the posted correction under [aspenflyright.org](https://www.aspenflyright.org)’s “Corrections” tab for additional details.

<sup>33</sup> The sole summary ([https://drive.google.com/file/d/1I2\\_ISScBHeXRn4J87bKWSM0F5AAPHG7/view](https://drive.google.com/file/d/1I2_ISScBHeXRn4J87bKWSM0F5AAPHG7/view), at 1:40:00–1:41:09) was that Lovins had “share[d] a great deal of time to walk through his philosophy on where he sees the electric and hydro-electric [misspoken for hybrid-electric] industry evolving to...” The AAB was told none of the content, nor that the analysis was undisputed yet contradicted the official narrative. Yet the AAB was charged by the BOCC ([https://aspenflyright.org/wp-content/uploads/2022/12/BOCC-revision-adoption\\_BOCC.res\\_105.2020-2-1.pdf](https://aspenflyright.org/wp-content/uploads/2022/12/BOCC-revision-adoption_BOCC.res_105.2020-2-1.pdf), Preface to Goals 12–15) to “evaluate...the outcome of update[d] fleet mix studies and make an alternate recommendation if necessary”—something it can hardly do without full awareness of the rapidly evolving competitive landscape.

<sup>34</sup> Bill Tomcich: R. Carroll, “Business Monday: Tomcich has no reservations about career change,” *Aspen Times*, 12 Nov 2018, <https://www.aspentimes.com/trending/business-monday-tomicich-has-no-reservations-about-career-change/>. He is routinely scheduled to speak at the end of each Airport Advisory Board meeting, updating airport statistics and rebutting any divergent views, and has long appeared to be the BOCC’s main source of information about aircraft fleets. The 1998–2018 president of Stay Aspen Snowmass, he promotes and negotiates air travel to Aspen/Snowmass and is a consultant to airports and communities. His background is in marketing, not aviation technology, and his expertise appears to be in flights more than in aircraft.

<sup>35</sup> AAB meeting, 15 Dec 2022, [https://drive.google.com/file/d/1iZy2n-HR\\_VV9uqv4tn1UGz7pVcB8pq/view](https://drive.google.com/file/d/1iZy2n-HR_VV9uqv4tn1UGz7pVcB8pq/view), at 1:37–1:45.

<sup>36</sup> Specifically, he characterized the SkyWest commercial fleet thus: United flies the newest CRJ700s, ~12–13 years old [validating our calculation at the end of Ref. 28 above], which will retire by “2030 give or take”; American has ~90 CRJ700s, all 17–19 years old, “pretty close to the end of their lifespans” (“probably to the end of the decade” at 1:40:56); and Delta’s four CRJ700s (to fly to ATL and LAX this winter) are 17, 17, 21, and 21 years old and have “another year or two left.” He apparently thinks CRJ700s can operate reliably and economically for only about 20 years (implying ~11 cycles every day) and must then retire: no life extension, no possibility of resumed production, and no procurement of younger planes from the active global secondary marketplace.

<sup>37</sup> Of course, in 2020–22, the pandemic put global aviation in a tailspin and traditional business models and route structures on life-support, severely disrupting aviation and scrambling its forecasts, but by now Aspen operations are about back to their pre-pandemic levels.

<sup>38</sup> One destroyed, 12 scrapped (Lufthansa City Line scrapped all its 9, 1 partially), and 1 written off.

<sup>39</sup> <https://www.planespotters.net/production-list/Bombardier/CRJ-700>.

<sup>40</sup> <https://www.skywest.com/about-skywest-airlines/facts>, as of 30 Sep 2022, and Earnings Release, <https://inc.skywest.com/assets/Uploads/PressReleases/SKYW-Q4-2021-Earnings-Release-2.2.2022.pdf>.

<sup>41</sup> [https://cptdb.ca/wiki/index.php/United\\_Express\\_CRJ700](https://cptdb.ca/wiki/index.php/United_Express_CRJ700); however, GoJet converted 25 to the more-luxurious CRJ550 interior configuration.

<sup>42</sup> “Bombardier CRJ 550,” <https://aerocorner.com/aircraft/bombardier-crj-550/>. Restarted 550 production was under discussion in 2021: [https://en.wikipedia.org/wiki/Bombardier\\_CRJ](https://en.wikipedia.org/wiki/Bombardier_CRJ). The 550 also offers optionality for reverse conversion of its 700 airframe into a 700 interior.

<sup>43</sup> Though there’s a strong case that United did CRJ700-to-550 conversions mainly to fit scope clauses, which unionized pilots enforce to protect their higher-paying mainline-plane jobs from encroachment by regional jets whose pilots often earn about half as much. This tends to raise the value of certain-sized regional jets like the CRJ700. S. Engel, “United Airlines Orders First-Class Regional Jets—But They’re Not For You,” 26 Feb 2019, <https://www.forbes.com/sites/samuellenge1/2019/02/26/united-airlines-orders-first-class-regional-jets-but-theyre-not-for-you/>. In that view, the superior passenger experience is a marketing side-benefit of what is chiefly United’s scope-clause play.

<sup>44</sup> <https://paxex.aero/united-bombardier-crj550/>.

<sup>45</sup> S. Engel, Ref. 43.

<sup>46</sup> <https://paxex.aero/pilots-furloughs-put-squeeze-on-us-regional-fleets/>.

<sup>47</sup> E.g. <https://runwaygirlnetwork.com/2019/11/united-crj550-impresses-in-revenue-service-but-lack-of-power-smarts/>,

<https://www.chicagotribune.com/business/ct-biz-united-airlines-crj-550-new-aircraft-20191024-vxiowsy4czama2qhowdfde2ju-story.html>.

<sup>48</sup> L. Bodell, “United Airlines Buys 18 CRJ700s From Mesa Airlines,” 6 Oct 2022, <https://simpleflying.com/united-airlines-buys-CRJ700-mesa-airlines/>.



<sup>49</sup> The CRJ700's Design Service Goal is 80,000 flights: [https://www.nts.gov/news/events/Documents/fuselage\\_forum-3.4%20Bombardier%20Final%2013th%20Sept%202011.pdf](https://www.nts.gov/news/events/Documents/fuselage_forum-3.4%20Bombardier%20Final%2013th%20Sept%202011.pdf).

<sup>50</sup> T. Keough, "Guest Commentary: So-called retirement of CRJ-700s a myth," *Aspen Daily News*, 5 Sep 2020, [https://www.aspendailynews.com/opinion/guest-commentary-so-called-retirement-of-crj-700s-a-myth/article\\_cb27ff82-ef0e-11ea-8b78-ebe7fc0ae37d.html](https://www.aspendailynews.com/opinion/guest-commentary-so-called-retirement-of-crj-700s-a-myth/article_cb27ff82-ef0e-11ea-8b78-ebe7fc0ae37d.html).

<sup>51</sup> S. Hamilton, "Catching up—DHC extends Dash 8 life," *Leeham News*, 11 Apr 2022, <https://leehamnews.com/2022/04/11/pontifications-catching-up-dhc-extends-dash-8-life-737-10-777x-a321xlr-certifications/>.

<sup>52</sup> A. Salvail, "'Scope clause' a major aspect of Aspen airport expansion discussions," *Aspen Daily News*, 15 Jan 2020, [https://www.aspendailynews.com/news/scope-clause-a-major-aspect-of-aspen-airport-expansion-discussions/article\\_b73ea4a8-3744-11ea-86ad-9b3922391dbf.html](https://www.aspendailynews.com/news/scope-clause-a-major-aspect-of-aspen-airport-expansion-discussions/article_b73ea4a8-3744-11ea-86ad-9b3922391dbf.html). A Bloomberg analyst (Ref. 53), for example, says United in 2018 "isn't considering moving large regional jets into its mainline fleet because it would cost more than \$1 million annually in additional pilot compensation for each of the planes, which generate only about \$10 million year." United's President said, "You take an airplane that's nicely profitable and you turn it unprofitable with that kind of cost structure."

<sup>53</sup> J. Bachman, "United Airlines Doesn't Want to Fly Too Many Types of Aircraft," *Bloomberg*, 19 July 2018, <https://skift.com/2018/07/19/united-airlines-doesnt-want-to-fly-too-many-types-of-aircraft/>. Complexity cost could, the author implies, inhibit United from buying A220s or Embraer's E2 family. Each new type bought adds training, parts, and management costs, raising the sales hurdle.

<sup>54</sup> Many in-service jets are aged from 30-odd years to the mid-40s. Many propeller-driven planes fly for even longer—some *much* longer, like DC-3s (which Amory Lovins flew from Washington DC to Denver in five hops around 1954). Of more than 11,000 rugged DC-3s built before and during World War II (the oldest one still registered was delivered in 1936), ~164 are still in regular commercial or military service, though not in scheduled passenger service (J. Bailey & C. Loh, "How Many DC-3 Are Still Flying?," 24 Sep 2022, <https://simpleflying.com/dc-3-operation/>). Some jet examples are at [https://simpleflying.com/what-is-the-oldest-operating-commercial-aircraft/?utm\\_medium=email&utm\\_source=daily&utm\\_campaign=20102020](https://simpleflying.com/what-is-the-oldest-operating-commercial-aircraft/?utm_medium=email&utm_source=daily&utm_campaign=20102020). The 767 has been flying since 1982 (40 years), 747s were produced for 54 years, and B-52s produced in 1954–62 are slated to retire in the 2050s—some approaching a century old.. Like people, individual airplanes or airplane types age at different rates, depending on their equivalent of genetic endowment, diet, exercise, stress, healthcare, and other determinants of actual biological aging.

<sup>55</sup> Bombardier also makes popular business jets, the largest based on the CRJ200 airframe.

<sup>56</sup> T. Casinader, "Bombardier CRJ700 Guide and Specs: The Quintessential Regional," *Aviator Insider*, <https://aviatorinsider.com/airplane-brands/bombardier-crj700/>.

<sup>57</sup> As of ~2018, according to then ASE Director John Kinney, Ref. 19.

<sup>58</sup> Ref. 50.

<sup>59</sup> There are four related but distinct classes in this family: [https://en.wikipedia.org/wiki/Bombardier\\_CRJ](https://en.wikipedia.org/wiki/Bombardier_CRJ).

<sup>60</sup> S. Hamilton, "Exclusive: Mitsubishi ponders restarting CRJ production," 6 Jul 2021, <https://leehamnews.com/2021/07/06/exclusive-mitsubishi-ponders-restarting-CRJ-production/>.

<sup>61</sup> Ref. 32, reaction by veteran Jacobsen | Daniels aviation consultant Bill Flock.

<sup>62</sup> S. Georgilidakis, "Mitsubishi: What's going on with the CRJ700 series?," 6 Jul 2021, *Mentour Pilot*, <https://mentourpilot.com/mitsubishi-whats-going-on-with-the-crj700-series/>.

<sup>63</sup> M. Russell, "Embraer Delays E175-E2 Aircraft Until 2027," 19 Feb 2022, [https://simpleflying.com/embraer-e175-e2-2027/?utm\\_medium=email&utm\\_source=getresponse&utm\\_content=%20Australia%27s%20Borders%20Fully%20Reopen%20On%20Monday%2C%20More%20Ukraine%20Flight%20Suspensions%2026%204%20More%20Trending%20Stories&utm\\_campaign=Simple%20Flying](https://simpleflying.com/embraer-e175-e2-2027/?utm_medium=email&utm_source=getresponse&utm_content=%20Australia%27s%20Borders%20Fully%20Reopen%20On%20Monday%2C%20More%20Ukraine%20Flight%20Suspensions%2026%204%20More%20Trending%20Stories&utm_campaign=Simple%20Flying).

<sup>64</sup> Reported as just 64 units worldwide in May 2021 despite its considerable attractions: J. Pearson, "The Rise & Fall Of The Bombardier CRJ-1000," 26 May 2021, <https://simpleflying.com/bombardier-crj-1000-rise-and-fall/>.

<sup>65</sup> M. Miracle, 17 Aug 2020, public comment in BOCC Packet for 16 Oct 2020, p 45. This view is especially notable because SkiCo cares much more about winter traffic than summer, when the E175 is least serviceable. However, in Ref. 35, Bill Tomcich acknowledged similar reservations if the EMB175 isn't re-engined to reduce or relieve the inadequacy of its high-altitude hot-day performance, which he said has caused American Airlines to reduce Texas boardings for Aspen in hot weather. As noted above, reengineering the E175 would require airframe recertification. (He also notes at 1:44:18 that a newly FAA-approved Gunnison Runway 24 approach can provide E175 crew training at Aspen's elevation, albeit with a longer runway and less challenging surrounding terrain, reducing its relevance.)

<sup>66</sup> 4 Nov 2020 BOCC at 1:51–1:54. Indeed, when Cliff Runge asked the BOCC in 2018 about the E175, offering confirmation that Embraer had done most of the technical analysis needed for ASE and hoped a regional carrier would soon do so, his suggestion was dismissed—perhaps because it wouldn't require airside redesign (C. Runge, personal communication to A. Lovins, 28 Dec 2022).

<sup>67</sup> J. Auslander, "Replacement aircraft for future Aspen commercial service finally identified," *Aspen Times*, 24 Jan 2022, <https://www.aspentimes.com/news/replacement-aircraft-for-future-aspen-commercial-service-finally-identified/>) begins: "After years of discussion about which airplane will replace the aging fleet now serving Aspen's airport, the most definitive answer yet finally came late last week. The Brazilian-made Embraer E-175 is the new airplane, and while it has not yet been approved to fly in and out of Aspen's challenging airport, nothing else is available to replace the Bombardier CRJ-700, which last rolled off its Canadian assembly line 12 years ago, officials said Friday." The Airport Director added, "It's not a done deal, but it's pretty close. In the near-term, this is the answer." He adds that the E175 version has 12% longer range than the CRJ700 (a comparison that depends on specific model and engine choices) and lower landing minima (it certainly has more-modern avionics). New approach procedures would need testing. Summer 2022 ASE tests had unannounced but reportedly unimpressive results. Since "this is the only option [in the pipeline]," apparently the CRJ900 and Q400 are still being excluded. Several ASE gates were equipped for E175s in 2022 with no prior public or AAB discussion. No operator is identified, but it seems plausible that any E175s will serve mainly or solely Delta, whose regional-fleet rationalization has made it long on E175s and short on CRJ700s. See also Ref. 68.

<sup>68</sup> P. Wolfsteller, "United confirms it will park up to 38 Embraer E175 jets in favour of Mesa CRJ900s," 30 Dec 2022, <https://www.flightglobal.com/fleets/united-confirms-it-will-park-up-to-38-embraer-e175-jets-in-favour-of-mesa-crj900s/151495.article>. Scope clauses are nicely summarized as pilot-contract provisions that "limit the number and size of aircraft that may be flown by the airlines' regional affiliates. They generally prevent carriers from farming out more flying to regionals...thus protecting [higher-paying] mainline pilot jobs."

<sup>69</sup> In addition to the CRJ550, a reversible interior conversion of the CRJ700 airframe to the world's only three-class 50-seat jet, which meets scope requirements and is well suited to Aspen's premium market.

<sup>70</sup> BOCC 15 Sep 2020, at 56:33–57:55 (<https://pitkincounty.ompnetwork.org/embed/sessions/153497/bocc-work-session-09-15-2020>). As Amory Lovins's 22 Nov 2020 memo to the BOCC (tenth hit on "Lovins" search at <https://pitkincounty.com/DocumentCenter/View/26724/ASE-Public->

[Comments-Comb-121620-Redacted](#)) explained at p 10, n 19, and text on pp 10–11, the County’s consultant Alex Seybold fully confirmed the basis of Lovins’s own conclusion that the CRJ900 “can meet Aspen’s operational requirements: the opposite claim [in all assessments for the County since 2012] was based *not on any technical unsuitability but only on operators’ presumed economic preference* for the 700 due to the 900’s greater expected hot-day weight restrictions—irrelevant, of course, to the winter peak season.” That economic preference arises from the 900’s 5% lower thrust/weight ratio than the 700—yet the resulting hot-day restrictions would be less severe than for the Embraer E175 that the Airport Director now considers suitable for ASE. As Lovins also noted, “Conversely, if the 700 were to retire as originally claimed, then any economic preferability over the 900 would also become irrelevant because the 900’s ‘insurance policy’ would have been cashed in: using the 900 would reflect operators’ value of serving vs. abandoning Aspen’s lucrative market, not on small marginal-cost differences vs. the departed 700.” Mr. Seybold (BOCC 15 Sep 2020, 48:42) also confirmed that the ASE Vision report’s critical “Commercial Aircraft Operational Capability” chart included aircraft with “the best capabilities of operating at the [ASE] airfield,” but that wasn’t about technical or safety capability—about “required aircraft performance due to surrounding mountain terrain” as the TWG reported (20 Dec 2019, p 4)—but rather about being not quite as *economic* as the 700 due to hot-day offloads. Yet that chart included the 700 and *four other* aircraft with such hot-day constraints, while omitting the 900. This muddling of absolute technical constraints with marginal economic preferences led Lovins to describe the 900’s exclusion as artificial and improper. These issues are also discussed on p 12 of the introduction to the Grassroots TV independent public forum, posted at <https://civicclerk.blob.core.windows.net/stream/PITKINCOCO/a11424564f.pdf?sv=2015-12-11&sr=b&sig=jYcXIov2KMyC6o1d2oJ27R8cRrj3dYmmoJoEdfanKg%3D&st=2022-12-08T21%3A19%3A29Z&sp=r&rsc=cache&rsct=application%2Fpdf>.

<sup>71</sup> Bill Tomcich at 1:03:10 in the 10 Nov 2020 BOCC hearing at the Hotel Jerome, <https://www.pitkincounty.com/374/County-Webcasts>.

<sup>72</sup> Namely that the CRJ900 “would never work at the Aspen airport.” See Ref. 70.

<sup>73</sup> Not just by airlines that don’t serve Aspen and whose fleets are 92% Embraer (Republic) or 100% Airbus (Frontier).

<sup>74</sup> 4 Nov 2020 BOCC at 1:05.

<sup>75</sup> The *Future Air Service Study Phase III* deck (Ref. 16, p 7) found the Q400 is the only currently Aspen-usable alternative to the CRJ700.

<sup>76</sup> De Havilland Canada vowed in 2019 to revitalize its Dash 8-400 (Q400) program, but paused production in 2021 when its backlog was assembled, temporarily resuming in late 2021 after a strike. Final assembly will move from Toronto (where the lease is expiring), probably to its centers in Calgary or Victoria, though resumed production may take up to 2–3 years. The Q400 offers a 50-seat configuration to suit scope clauses, plausibly claimed to beat the CRJ550 on economics. DHC is also collaborating with UTC on an electric retrofit of the Q400 and with ZeroAvia on a hydrogen retrofit. Competition, mainly with ATR, remains stiff, but there is enough market interest in these efficient, comfortable, high-performance turboprops to make the Q400 a good bet.

<sup>77</sup> The Q400’s official range is 1,100 or 1,125 nm, one-fifth below the CRJ700’s. Compare Aspen’s 640-nm flight distance to Los Angeles, 794 to Houston, 880 to Chicago, and 1,134 to Atlanta, and add appropriate reserves. Potential bladder supplementation or perhaps more-efficient engines than its 1998-vintage PW150 could further increase range.

<sup>78</sup> B. Fehrm, “Carbon footprint: Regional jet versus turboprop, how large is the difference?,” *Leeham News and Analysis*, 27 Jan 2022, <https://leehamnews.com/2022/01/27/carbon-footprint-regional-jet-versus-turboprop-how-large-is-the-difference/#more-38364>.

<sup>79</sup> As explained on pp 12–13 of the introductory Grassroots TV narration cited at the end of Ref. 70, the Q400 was excluded in three different ways: (1) in the 2018 ASE feasibility assessment “because of their declining numbers in the North American market” (irrelevant to an “insurance” option: if airlines need it to serve the lucrative Aspen market, they will have no trouble getting and flying this still-produced aircraft, and the analysis should focus on ASE-specific needs, not general-market trends); (2) by a Technical Working Group comparison that ranked it one notch below the CRJ700, based on a comparative table whose logic and math Lovins could not reproduce in either of its versions (the 76-seat Q500 was found less sensitive to hot days than the CRJ700, quieter on two of three metrics, and tied for top operational ranking despite a 300-nm-shorter nominal range); and (3) in the final report, by confining the discussion to jets only. All three exclusions are invalid. This modern turboprop, with active noise and vibration suppression, is nearly as quiet inside as a jet, quieter outside by two of three metrics, popular with pilots and customers, very cargo-capable, more agile than the CRJ700, great at high altitude (such as La Paz), and operationally superior for Aspen because of its slower landing, steeper descent option, probably better bad-weather landing capability, and avoidance of the 700’s hot-day weight limits. (See C. Loh, “The DeHavilland Dash 8—37 Years of History,” 26 Jun 2020, [www.simpleflying.com/dehavilland-dash-8-history/](http://www.simpleflying.com/dehavilland-dash-8-history/).) Many old-timers fondly recall its predecessor Dash-7’s capability in marginal weather unflyable by jets. Lovins for one cares less if his Denver, California, or Texas nonstop is in a modern turboprop, nearly as quiet and fast as a jet, than if it can get him home safely in Aspen-roulette weather. In the 16 Oct 2020 BOCC meeting at 66:15, when then-Chairman Steve Child fondly recalled turboprops, the consultants called the Dash-8 Q400 a “great airplane, very powerful, easily able to operate into Aspen,” but said its “favor has dramatically fallen in the US because customers prefer jets and their smoother ride.” That’s not a valid argument for Aspen’s very specific needs, especially as an “insurance policy.” The Q400 is readily found and is now in increased demand, including by lessors, to meet the transformed market conditions. And in the very unlikely event ASE’s carriers were running out of eligible and available planes, customers would surely rather fly the Dash-8 Q400 than nothing. That renders irrelevant the claim that “its sweet spot is on missions less than 300 miles,” making it less attractive to two specific smaller airlines serving mainly different markets (Bill Tomcich at 1:04:10 in 10 Nov 2022 BOCC hearing, <https://www.pitkincounty.com/374/County-Webcasts>). How do we know Aspen customers would accept the Dash-8 Q400? Because Frontier/Republic’s ASE/DEN service *flew it during 2008–16, directly and successfully competing against the CRJ700* and, according to Bill Tomcich, expected to cut airfares. Why would the same flyers who gladly flew that plane seven years ago reject it now? Also of note, Embraer’s 2022 Market Outlook foresees global demand for 2,280 new turboprops, despite postponing its own next-generation version due to an apparent temporary gap in necessary launch conditions (G. Amati, “Embraer Confirms Turboprop Project Is Suspended,” 12 Dec 2022, <https://simpleflying.com/embraer-turboprop-project-paused/>; Embraer has privately confirmed that this is a pause, not a cancellation as incorrectly reported in some trade press).

<sup>80</sup> Ref. 35 at 1:40:12. The context wrongly implied that the Q400 was retiring due to age or market maturity, and it discussed only the US market, which is about 5% of the world market.

<sup>81</sup> A 26 December 2022 search of a 24-page granular global database (<https://www.planespotters.net/production-list/De-Havilland-Canada/DHC-8?p=1>) showed that of the 1,305 Dash 8-Q4s built during 1986–2022 (actually begun in 1983, an impressive 39-year span and not over yet), 815 (63%) were in active service, 125 (10%) parked, 220 (17%) stored (27 by Horizon) or preserved, 138 (11%) scrapped or written off, and 2 destroyed, with 4 more on order. The oldest of more than 60 US active units are two US Air Force planes built in 1996. Minor US airlines operated at least 25 (excluding Alaska’s 13-year-old fleet of 11). It’s very popular in places like Canada, Australia, New Zealand, Japan, and the European Union.