

# ALERT BULLETIN

AB 2025:19/3-7

8/29/2025

2228046

TO: Embraer-Empresa Brasileira Aeronautic S/A

INFO: FAA (AVP-1, AVP-200, AFS-200, AFS-260, AFS-100, MKC-AEG, AIR-360, AIR-720, AFS-300, AFS-900), A4A, ALPA, ASAP, ATSG, CAPA, IAM, IBT, ICASS, IFALPA, IPA, NBAA, NTSB, PAMA, RAA, TWU

FROM: Becky L. Hooey, Director  
NASA Aviation Safety Reporting System

SUBJ: EMB Legacy 600 Total Electrical Failure

We recently received ASRS reports describing a safety concern that may involve your area of operational responsibility. We do not have sufficient details to assess either the factual accuracy or possible gravity of the report. It is our policy to relay the reported information to the appropriate authority for evaluation and any necessary follow-up. We feel you should be aware of the following:

ASRS received a report from an EMB Legacy 600 flight crew describing an in-flight total electrical failure event. The Captain stated they were in cruise flight at FL390 when they noted the loss of #4 generator. This was followed later in the flight by the loss of the remaining three generators. Flight crew maintained control with the standby attitude indicator, started the APU to regain some systems, and subsequently landed safely at the closest suitable airport.

To properly assess the usefulness of our alert message service, we would appreciate it if you would take the time to give us your feedback on the value of the information that we have provided. Please contact Dr. Becky Hooey at (408) 541-2854 or email at [becky.l.hooey@nasa.gov](mailto:becky.l.hooey@nasa.gov).



Aviation Safety Reporting System  
P.O. Box 189 | Moffett Field, CA | 94035-0189



**ACN 2228046****DATE / TIME**

Date of Occurrence 202503  
Local Time Of Day 1801 to 2400

**PLACE**

Locale ZZZ.ARTCC  
State US  
Altitude - MSL 39000

**ENVIRONMENT**

Flight Conditions VMC  
Weather Thunderstorm

**AIRCRAFT / EQUIPMENT X**

ATC / Advisory - Center ZZZ  
Make Model Name Embraer Legacy 600 (EMB135BJ)  
Operating Under FAR Part 135

**COMPONENT 1**

Aircraft Component Electrical Power

**PERSON 1**

Function - Flight Crew Captain  
Function - Flight Crew Pilot Flying  
ASRS Report Number 2228046

**PERSON 2**

Function - Flight Crew First Officer  
Function - Flight Crew Pilot Not Flying  
ASRS Report Number 2228716

**EVENTS**

Anomaly Aircraft Equipment Problem - Critical  
Detector - Automation Aircraft Other Automation  
Detector - Person Flight Crew  
Result - Flight Crew Diverted  
Result - Air Traffic Control Provided Assistance

**NARRATIVE 1**

I was acting as pilot in command (PIC)/pilot flying (PF) in left seat of aircraft, flying at FL390, en route from ZZZ to ZZZ1. First indication of a problem was an amber GEN 4 OFF BUS message. Pilot monitoring (PM) pulled out QRH, we identified GEN 4 switch and reset as per QRH, which corrected the indicated problem. Approximately 20 to 30 minutes later, we simultaneously got amber GEN 1-2-3 OFF BUS and SHED BUS 1-2 OFF messages. Cabin Attendant later recalled that at this time she noticed Cabin lights starting to "pulse" between full on and dim, without ever going completely off. We knew we had a serious electrical problem at this time. We requested descent to FL350 with intention of starting APU to guarantee we would have one functional generator in operation. Using QRH procedures we were able to clear the EICAS messages and have everything operational again, but were not "trusting" the systems to remain functional. PM reviewed the QRH as we discussed possible scenarios and related options. As we leveled at FL350 we began to power up the APU. We then got an amber GEN 2 OFF BUS message. Before we had the opportunity to take any corrective action, we had a "complete electrical failure" and "everything went dark." Standby attitude indicator (powered by an

independent battery) remained active, so I focused on that for maintaining aircraft control. Within seconds, the APU became fully active, and the APU generator started to provide power to SOME systems. PM indicated "I've got nothing on my side." Cabin Altitude was also starting to climb. We requested priority handling, PM advised ATC we've had an electrical failure, and we needed an immediate descent. We were cleared down to 14,000 feet. I was hand flying with no autopilot, and we started down. PF and PM both donned Crew masks and reestablished communications. We discussed options and priorities, and determined the prudent course of action was to land at the nearest suitable airport. I recall ATC advising that ZZZ2 was about 30-35 miles away, and we accepted vectors in that direction (about 25-30 degrees to the right of our current course). As we descended, I looked back and made eye contact with some of the passengers. Cabin attendant was doing a fine job of keeping things relatively calm in the back. I also noted that we descended quickly enough to NOT have the passenger oxygen masks deploy. Approaching 14,000 feet we were cleared to continue descending to 11,000. I noted a cloud layer below and, not trusting that our anti-ice system would be functional, advised the PM that I would slow our descent rate to allow us to remain above the clouds. At 11,000 feet we removed our masks, while continuing our descent. We started receiving vectors for the ILS XX into ZZZ2. PM tuned the frequencies and we reviewed the approach plate. I maintained control using the standby attitude indicator while simultaneously referencing the "green needles" on the Primary Flight Display (PFD). The ILS display appeared to be working properly, and matched the vectoring information we received from ATC (they vectored us across the LOC, and the needle appeared to follow, as well as seeing the "glideslope was alive"). I hand flew the approach. When we started seeing lights on the ground out the side windows, we realized that the electrically powered windshield heat was also not operational. We had to continuously wipe off the windscreen to see ahead. Humorously, ATC gave us the wrong frequency for ZZZ2, but since we had the plates out on our EFBs, PM was able to make the call on the correct frequency. Tower cleared us to land. We noted on short final that our landing lights did not seem to be doing anything, but I was able to land by referencing the runway edge lighting. The Taxi Light was also providing minimal help, only illuminating perhaps 10 feet in front of the nose, so it was a long, slow taxi between the blue lights. Airport Fire Truck did a runway sweep behind us and followed us to the ramp, standing at the ready, but we did not require any assistance from them.

#### THINGS THAT WENT WELL:

- Proactively descending to appropriate altitude for APU start.
- "Reading ahead" in the QRH to develop possible courses of action.
- Good crew coordination and communication between PF and PM.
- Good briefings and use of EFBs, with associated charts.

#### AREAS TO IMPROVE:

- Take less time in donning crew oxygen masks. (PF hand flying, so waited for PM to mask up and then complete a transfer of controls before PF donned mask)
- Be ready for EXTREME high volume when donning mask. Be ready to turn down the volume. Just the amplified sound of our breathing was enough to drown out radio calls.
- If possible, provide more information to the Cabin Attendant earlier in the process. Keep the "whole team" In The Loop.

-Have something dedicated to the Flight Deck specifically for use to wipe a fogged over windscreen. We got by using our hands, but a dedicated towel or rag would have been welcomed.

## **NARRATIVE 2**

While at a cruise altitude of FL390 to ZZZ from ZZZ1 "Gen 4 OFF BUS" master caution illuminates. The PF assumed flying and radios. As PM I ran the QRH and one attempt to reset failed generator. The captain (PF) suggested a second reset and I disagreed. The captain reset Gen4 a second time. All messages cleared approximately for 15 minutes then a cascade failure of "GEN 1-2-3 OFF BUS" master caution illuminated and "SHED BUS 1-2 OFF". I ran the QRH once again for failed generators, resetting each one individually. After a brief discussion we both agreed a descent needed to be made so that we can get the APU GEN online. We requested a descent with ATC and started the APU. Approximately 30 seconds after starting the APU and before it came online we lost all power from the Gens. Leaving us in an electrical emergency situation. I turned back and prompted the flight attendant to sit down and I quickly donned my oxygen mask. We started a descent and PF transferred controls and donned his oxygen mask. After a momentary loss of comms with ATC we Advised ATC and requested nearest airport available. Center advised ZZZ2 was about 53 miles away from current position. We requested weather from center and vectors for ILSXX. Around this time the APU Gen and Gen4 came online. Only the Captains side MFD (Multi-Function Display) was available and the ADC were showing unreliable data so we decided not to use the autopilot. We picked up the field visually about 7 miles out and landed uneventfully.

## **SYNOPSIS**

Embraer Legacy 600 flight crew reported a complete electrical failure during cruise at night, resulting in loss of flight instruments except for the standby indicator. The electrical failure resulted in multiple system failures. The crew diverted to an alternate airport and landed safely.