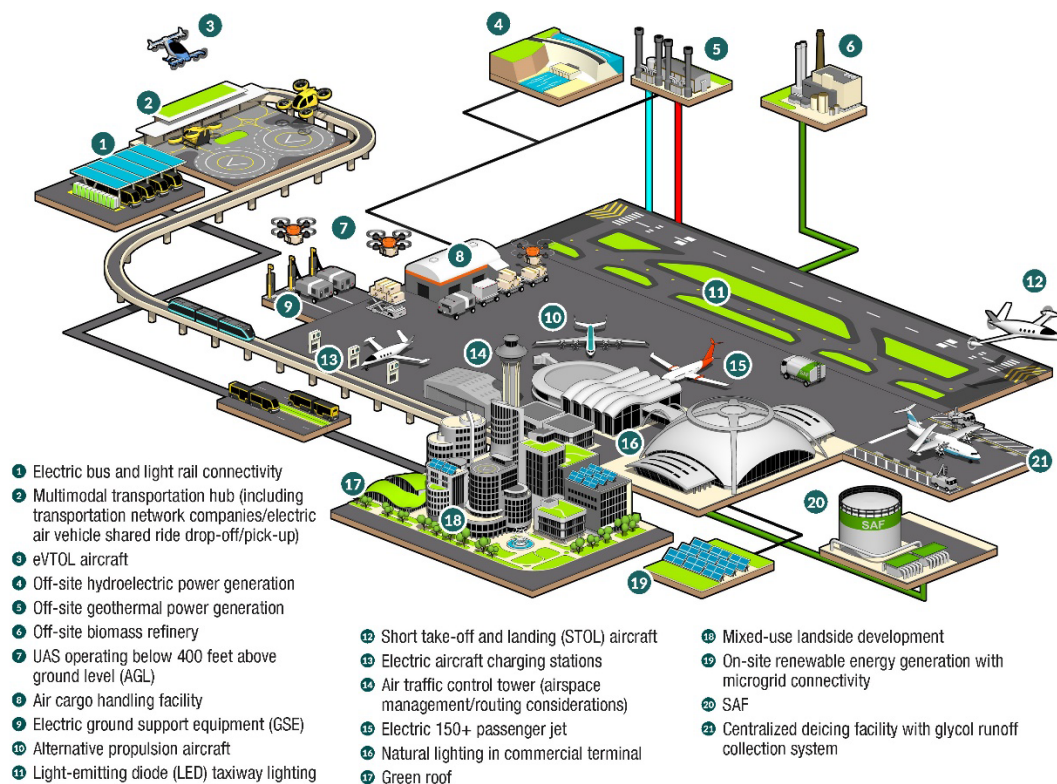# Airport of the Future

Commercial aviation has evolved over many decades of service. What began as large taildragger, piston engine propelled airplanes, has over time been replaced by modern airplanes with sophisticated turbofan jet engines, composite components, and numerous state-of-the-art advancements. Countless citizens and companies rely on air transportation for their needs. Unfortunately, during this evolution, commercial aviation has also created aircraft noise and harmful emissions; both which have been proven to adversely impact the people that live and work under aircraft flight paths.

Forecasts indicate the need for air transportation is likely to continue steady growth. With Sea-Tac airport nearing capacity, commercial service airports in the region could become overwhelmed with consumer and industry air transportation demand unless the state can develop an acceptable alternative. Given the constraints on expanding existing airports in Puget Sound, the proposed solution is an airport of the future.

A key consideration when siting a new airport is that it be in a rural area with low population density. The size of such a facility will require a substantial footprint, and rural areas are better suited to displace the least number of people possible, if required.

1. Electric bus and light rail connectivity
2. Multimodal transportation hub (including transportation network companies/electric air vehicle shared ride drop-off/pick-up)
3. eVTOL aircraft
4. Off-site hydroelectric power generation
5. Off-site geothermal power generation
6. Off-site biomass refinery
7. UAS operating below 400 feet above ground level (AGL)
8. Air cargo handling facility
9. Electric ground support equipment (GSE)
10. Alternative propulsion aircraft
11. Light-emitting diode (LED) taxiway lighting
12. Short take-off and landing (STOL) aircraft
13. Electric aircraft charging stations
14. Air traffic control tower (airspace management/routing considerations)
15. Electric 150+ passenger jet
16. Natural lighting in commercial terminal
17. Green roof
18. Mixed-use landside development
19. On-site renewable energy generation with microgrid connectivity
20. SAF
21. Centralized deicing facility with glycol runoff collection system

There are many factors that could be part of an Airport of the Future.

- Improved environmental responsibility. The airport facility, and all aircraft, vehicles and equipment should strive to meet or exceed federal and state guidelines related to air and water quality, noise, light, habitat, wetlands, and greenhouse gas emissions.
- Improved socially responsibility. The airport should be the epitome of diversity, equity, and

inclusion. It should not adversely affect the lives of historically disadvantaged communities and should provide accessibility for all and public benefit for the region.

- Provide an economic engine for the community. It should be financially self-sufficient, generating enough revenue to sustain operations, maintenance, and capital improvements. It should provide living wage jobs and economic vitality for the community and the region.
- Improved energy efficiency. The airport of the future should integrate consumption reduction measures, maximize use of renewable energy, incorporate electric vehicle fleets/ ground support equipment/ on-airport transit and transport equipment, and align with state goals for carbon reduction. It should conserve natural resources and employ on-site electrical storage and power generation.
- Incorporate modern ground transportation and transit technologies, including electric, compressed natural gas, hydrogen, and other sustainable power technologies.
- Integrate the latest technologies in aircraft propulsion, including hybrid-electric, all electric, and hydrogen.
- Improve air transportation through the integration of aviation technological advancements in Uncrewed Aircraft Systems (UAS) and electric Vertical Take-off and Landing (eVTOL) aircraft.
- Maximize the use of Sustainable Aviation Fuel (SAF), a powerful bridging strategy for removing emissions in the near and midterm. Long-haul aircraft could rely on SAF for an undetermined time.
- Enable Distributed Air Service

  Distributed Air Service is a relatively new term that relies on the well-known, proven hub-and-spoke model. Distributed Air Service differs from the traditional model in that the nodes for each spoke are community and general aviation airports.

  The important benefit of distributed air service is it restores, creates new, or expands existing regional air service for communities across the state. Currently a small number of airports in Washington state support limited air service such as Wenatchee, Yakima, Friday Harbor, Pullman, and Walla Walla. In most cases these airports have one destination: Sea-Tac airport. As air transportation volumes have increased over the last decade at Sea-Tac, flights from the regional airports have curtailed. For communities not near one of these regional commercial service airports, travelers and shippers must drive long distances to access commercial air transportation. In 2020, the WSDOT Electric Aircraft Feasibility Study identified an additional sixty airports across the state that have the potential to support regional air service. It is important to note that due to Sea-Tac's capacity constraints, distributed air service would require connection to a hub airport other than Sea-Tac, either somewhere in Washington state or in a neighboring state.

  Point-to-point regional air service is another potential added benefit. Using these same airports, passengers and freight could move by air across the state, not to hubs, but to other community airports. For example, instead of flying to Sea-Tac airport for a day of business in Seattle, passengers could instead fly to Boeing Field.

  Both models of air transportation could greatly increase connectivity across the state, reduce travel times, and remove cars from the road.

The airport of the future has the potential to accommodate both domestic air travel and provide connections to regional community airports. Emerging aviation technological advances are on track to grow to scale over the next two to three decades and combined with many other technological improvements give credible support to our state moving in this direction.