The civil air transport sector is facing considerable challenges with regard to its future perspectives: enormous growth rates on the one hand and constrained infrastructural adaptation measures on the other hand require an integration of new technologies and aircraft concepts. Furthermore, rising energy prices call for significant efficiency improvements in energy usage. Yet, the actual benefit of new technologies strongly depends on the characteristics of the operational environment. For a profound analysis of this benefit, the impact of new technologies on the aviation sector needs to be evaluated. This can only be accomplished by simultaneously considering future environmental conditions. This paper depicts a scenario-based approach that is able to provide comprehensive, alternative pictures of the future (scenarios), forming the foundations of a sound technology assessment technique.