A strategy that combines an effective BIM work process with targeted simulation capability can greatly facilitate an ability to strategically evaluate multiple design variations for improved delivered performance, in other words enable “optioneering” early in the project planning and execution. A historically successful example of this strategy was demonstrated back in the 1990’s and had nothing to do with buildings. The Boeing 777 aircraft, as many people know, was the first commercial plane to go straight from the computer into production and into the air without a real-world test flight. It took a lot of simulation modeling to make this happen. What is perhaps even more interesting is that the entire project was based on BIM principles and practices that resulted in highly effective multi-stakeholder collaboration and a dramatic reduction in drawings, change requests, rework, and assembly interfaces, among other innovations.

Bechtel has constructed a vast array of major plants and infrastructure projects around the world. For whatever facility we build, the client needs to be assured that when he ‘flips the switch’ everything will work right from the start of operation. A multi-disciplinary approach to analysis and visualization has often been applied successfully to “optioneer” areas of potential performance improvement and risk reduction. Representative examples of simulation application on our projects has involved the use of computational fluid dynamics for optimizing environmental air quality both inside and outside the facility. Examples range from design-oriented projects such as airports to infrastructure projects and industrial focused projects – very different in terms of function and design but both driven by a need for environmental comfort and compliance.
These efforts in the past have been rather “ad-hoc” and typically not well integrated with the project design process. BIM offers the potential to greatly expand the utilization of toolsets for design optimization and greater awareness of the cross-discipline impact of design options on aspects such as schedule, cost, constructability, etc. The Boeing example is great because it shows how BIM really drives the innovation process, which starts with a multi-stakeholder game plan and then is enabled by technology. This same approach – albeit with different stakeholders, tools, practices, and product – can enable better focus on the optioneering side of BIM for our EPC Projects and ensure that the focus right from the start of a project is on optimizing the performance of the constructed facility. This will allow for development of multi-faceted models that contribute to an evolution of the design, rather than just a static improvement.

In my presentation I will initially discuss the Boeing example as a point of reference, and then briefly provide some background on the evolution of simulation use at Bechtel for supporting optioneering of various significant projects. This discussion will include some important points as to what business drivers are important for our projects that will help guide our deployment strategy for BIM. I will then present a couple of examples of BIM technologies of interest to us and how they can lead to more effectively achieving the end goal of design improvement from the standpoint of constructability and facility performance.