

## Discussion 6: Understanding Systems Thinking

### **Objective**

The purpose of this discussion is to ensure that each student has a good understand of what constitutes a “complex engineering system” and what qualifies as “systems thinking.” These concepts are useful policy tools as they also introduce a new way of thinking about complex problems and suggest methodologies to evaluate systems. Understanding of “systems thinking” is especially important to TPP students, as part of the Engineering Systems Division. You will find that this understanding of the concepts of systems thinking will be useful in constructing your thesis, conversations with policymakers, and in explaining “ESD” on job interviews.

### **Assignment**

Read the three Engineering Framing Papers posted on MIT Server, written by Dan Roos (“Engineering Systems at MIT – The Development of The Engineering Systems Division”), Daniel Hastings (“The Future of Engineering Systems: Development of Engineering Leaders”), and Joel Moses (“Foundational Issues in Engineering Systems”). Using the ideas in these papers, as well as material learned in ESD.10 classroom lecture, frame your own definition of what constitutes an “engineering system” and “systems thinking.” Be prepared to share your ideas in discussion group through a group brainstorming session.

### **Deliverable**

Write a one-paragraph (4 to 5 sentences) definition of “complex engineering system.” Similarly, write a one-paragraph definition of “systems thinking.” There is no “right” answer for this assignment. You can use ideas in the ESD framing papers, ideas from your other TPP classes, or ideas generated from you own personal or professional experiences. It might be helpful to provide an example of a current complex engineering system or an example of a system that you do not think qualifies as a complex engineering system. It also might be helpful to consider if advanced technology itself constitutes a complex engineering system, or if framing the technology and system qualifies a systems as complex.

Your responses should be types and be no longer than one page total. They will be due at the conclusion of your discussion session. The responses will be graded on a pass-fail metric. While grammar and spelling errors will not count against you, please use complete sentences to structure your definitions.