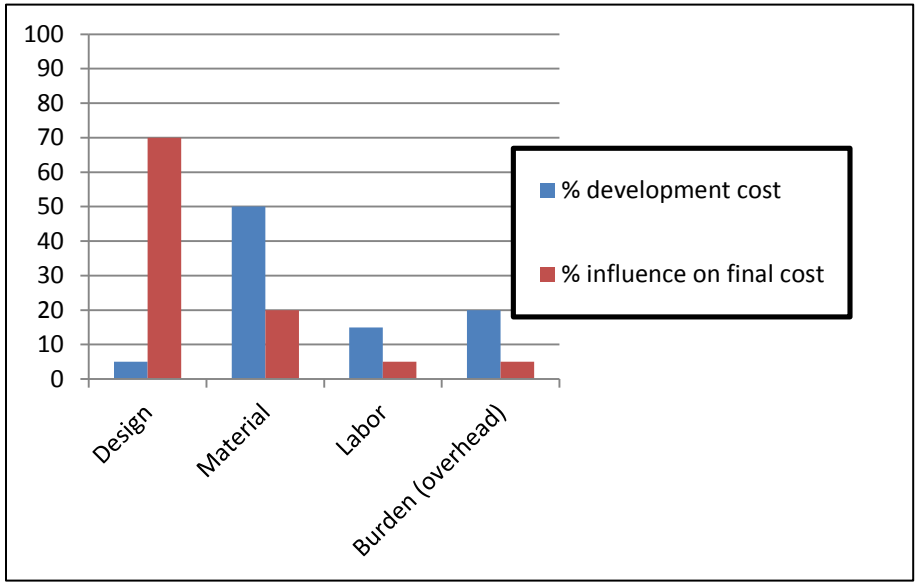
NATIONAL ENERGY TECHNOLOGY LABORATORY

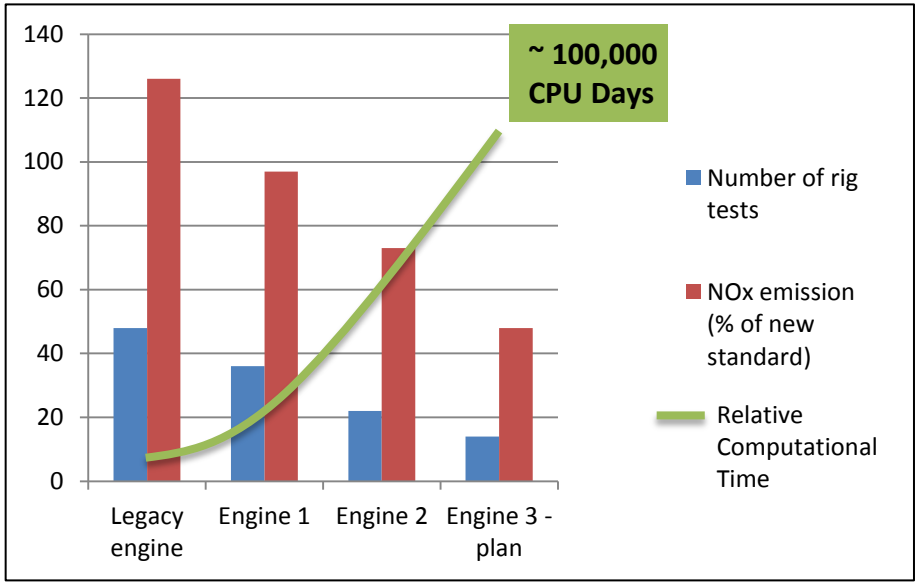
Process Design, Integration & Optimization

Geo Richards, Focus Area Leader, Energy System Dynamics
Office of Research & Development

The role of design and simulation on products



Data for new aircraft engine development. Percentage of total development cost and percentage influence on the final cost. Cost breakdown in four main development categories: design, materials, labor, and burden (overhead).



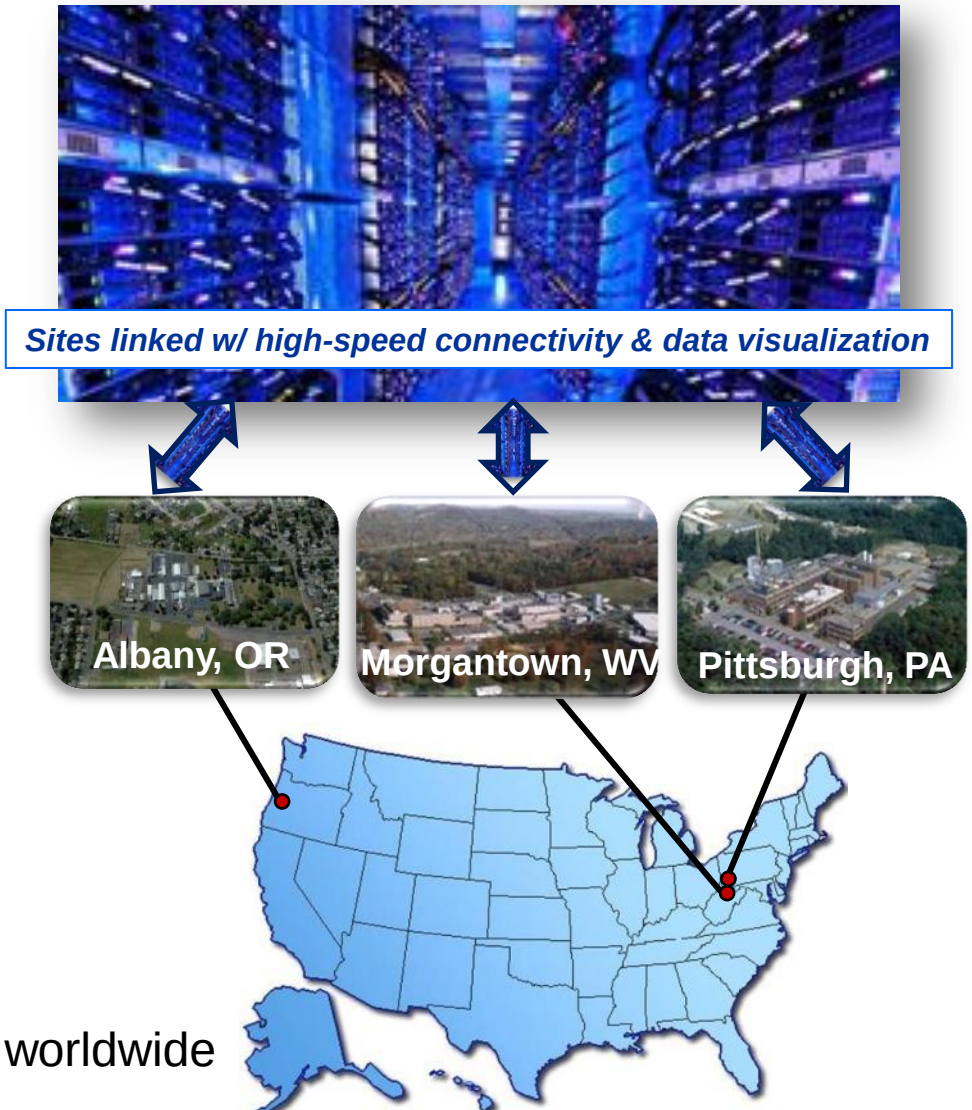
Four engine development programs, showing the number of rig tests needed for development, the NOx emission of the final engine, and a relative measure of the computational effort, expressed as Central Processing Unit (CPU) time.

Epstein, A., (2011). Aviation Challenges for Combustion Science and Technology in the 21st Century, Presented at the US Sections Meeting of the Combustion Institute, March 21 – 23, Atlanta, Georgia.

Simulation Based Engineering User Center (SBEUC)

Chemical looping experimental facility

Starting operation December 2012



503 Tflops; 26,000 Processor Cores
22nd fastest supercomputer in the world
43rd most energy-efficient supercomputer worldwide

Today's session

Overview :
Geo Richards, NETL

Simulation-based Engineering:
David Miller, NETL

Application of Optimization to Industrial Problems:
Nicholas Sahindis, CMU

Thermal Management for Improved Efficiency:
Michael Barringer, Penn State

Partnering for Innovation: Power Electronics for Smart Grid:
Gregory Reed, Pitt