**Statement of Work for Kuda physics engine**

**Purpose**:

The purpose of this project is to create a visually rich, immersive experience for students who are running energy simulations. By engaging the user in an interactive, three dimensional world we can effectively communicate basic concepts to students at all levels. In addition, advanced users will be able to explore the subtleties of complex energy systems through experiential learning. We believe this is consistent with DOE’s strategic goal of achieving energy security through promoting scientific and technological innovation.

**Scope**:

The primary scope of my work will be to extend the Kuda WebGL library, adding a special purpose physics engine. This engine will visually render aspects of fluid and thermal dynamics as well as some elements of lighting and electrical systems. I will design and tune the system specifically to handle output from the widely used Modelica modeling language and EnergyPlus simulation software.

**Challenges**:

Integration with the existing Kuda code-base as well as full Three.js compatibility will be a priority. Limited computational resources need to be intelligently allocated at run-time to ensure accurate processing of simulation data as wells as smooth, realistic 3D animation.

**Limitations**:

The physics engine will not render Brownian motion, nor will it be concerned with collision detection or rigid body dynamics.

**Deliverables**:

The deliverables will be:

1. A modular, open-source, JavaScript code-base
2. Example projects demonstrating the capabilities of the system
3. Concise documentation written for developers and content creators