**Simple, Serious, and Solvable: The Three S’s of Climate Change**

**Climate Change is Simple**. Heat in minus heat out equals change of heat. When Earth absorbs more heat than it emits, the climate warms. When it emits more than it absorbs, the climate cools. This simple principal explains why day is warmer than night, summer is warmer than winter, and Miami is warmer than Minneapolis. It also explains why adding CO2 to the air causes global warming. The absorption of thermal infrared radiation by CO2 was first measured 150 years ago, has since been confirmed thousands of times by labs all over the world, and is extremely well understood. There is no doubt at all that adding CO2 reduces Earth’s heat emission and therefore causes global warming.

**Climate Change is Serious**. Warmer average temperatures are associated with dramatic increases in the frequency of extremely hot weather. Warmer air evaporates more water from soils and vegetation, so even if precipitation doesn’t change the demand for water will increase with warmer temperatures. Adding water vapor to the air also means there is more water available for heavy rains when the right conditions occur: this means that in addition to more drought, a warmer climate will include heavier rainfall during extreme events. Warmer ice sheets release more water the oceans, which also expand as they get warmer. These two influences raise sea levels, threatening coastlines everywhere. Higher seas imply much more frequent coastal flooding, requiring abandonment long before mean sea level reaches coastal infrastructure. Without strong policy, these impacts will become more and more severe almost without bound, growing to become the most serious problems in the world and lasting for many centuries after fossil fuels are abandoned. The consequences of unchecked climate change to the global economy are unacceptable.

**Climate Change is Solvable**. Preventing catastrophic climate change will require abundant and affordable energy to be made available to people everywhere without emitting any CO2 to the atmosphere. This will require both the development of energy efficient infrastructure and very rapid deployment of non-fossil fuel energy systems, especially in the developing world. From an engineering perspective, both objectives are eminently feasible with mature technologies. Economically, the clean energy transition will be expensive, involving roughly 1% of the global economy. This cost is comparable to previous development achievements such as indoor plumbing, rural electrification, the global Internet, and mobile telecommunications. Our descendants will better lives by developing and improving their infrastructure just as our ancestors did.