



Energy and the Maritime Environment

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The world is seeing a “tremendous industrialization of the oceans,” according to Jesse Ausubel, Senior Research Associate and Director, Program for the Human Environment at The Rockefeller University, speaking in the HKS energy policy seminar on the current situation with respect to finding, shipping, and using energy in the oceans, and of some significant but sometimes overlooked environmental consequences.

Oil and gas related structures, as well as offshore windmills, are creating an “ocean of things,” Ausubel said, with infrastructure ranging from oil platforms to pipeline to windmills to artificial islands being built farther and farther from shore. Within the next decade, Ausubel said, there may as many as 50,000 windmills in the ocean, along with an extensive oil and gas infrastructure, an increasing share of which may be primarily deep underwater. The environmental consequences are “hard to anticipate,” he said.

In both energy and overall economic terms, “oil and gas are the big show, in terms of lucre,” Ausubel said. The oil and gas industry, for the US and globally, is the “largest source of wealth from the oceans,” “overwhelming” the revenue from shipping and fishing. Of other sources of possible ocean energy, only wind seems poised for significant growth, Ausubel said. Experiments with tidal energy, with biomass generated from ocean algae, and with ocean thermal energy conversion suggest that it will be extremely difficult and expensive to generate any significant amount of energy through these methods.

One challenge faced by all ocean structures is harsh ocean conditions. “The ocean metabolizes objects,” Ausubel observed. For example, he projected that offshore windmills will last only half as long as generally predicted. The result that old infrastructure is constantly being retired, even as new infrastructure is built—raising the question of whether retirement should mean full removal, or whether there is potential for re-use of old infrastructure as artificial reefs—and of whether better design choices are possible that might make removal or re-use easier.

Shipping itself has grown significantly, Ausubel noted, with the greatest growth being in container ships transporting goods around the world. In a positive development, he said, “Tanker oil spills have basically stopped,” reflecting improvements like double hulls, better pilot training, and the low-tech innovation of banning alcohol on these vessels. In terms of environmental improvements that could be made, Ausubel suggested that transitioning to cleaner fuels for ship propulsion is a significant opportunity. Currently, a lot of “very dirty” diesel is used to propel ships, but LNG and CNG are good alternatives, Ausubel said, and more use of electric propulsion is possible as well. In fact, he said, the ocean is ideal for electric propulsion, because “weight doesn’t matter much.” This kind of change, which Ausubel thinks could realistically be achieved by mid-century, could significantly improve the air quality over the ocean.

In addition to air pollution, Ausubel said, noise pollution is an important concern. With increasing shipping, drilling, and construction activity, “oceans are getting noisier,” Ausubel noted. In fact, human-caused noise is now about equal to natural noise in the oceans—a development whose impacts on wildlife is not well understood.

Ausubel spoke as part of the Kennedy School’s Energy Policy Seminar Series, which is sponsored by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government and by the Belfer Center for Science and International Affairs.

