One of the challenging problems with offshore wind is siting the wind farms in order to get the most value, both economic and environmental. We look at this problem from a large scale systems perspective, thinking about how a large number of wind farms should be sited considering their interactions. We are developing a model for large scale offshore wind farm planning using a Genetic Algorithm. The principle behind Genetic Algorithms is the Darwinian concept of an adaptation procedure based on the mechanics of natural genetics and natural selection. The best fit individual within a given population of organisms are more likely to have reproduction in the future population than an individual who have the least fitness. This algorithm will help us to efficiently identify wind farm siting strategies that balance economic and ecological benefits.