Sociecity: The Future of Public Spaces

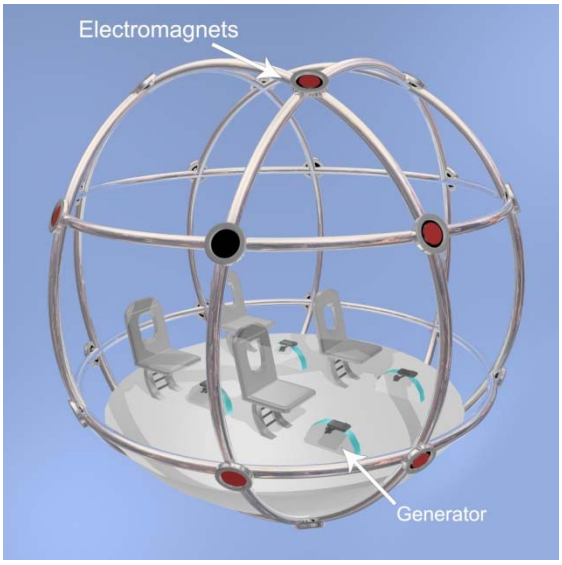
Sociecity is located at 39.3254° North, 77.7389° West, along the banks of the Potomac River in Eastern Virginia. In addition to four seasons, the subtropical climate boasts 109 centimeters of annual rainfall. Home to 1.8 million people where the median age is 35, the city celebrated its 105th anniversary this year in 2066. The main industry in Sociecity is high tech specifically focused on state-of-the-art power generation.

The primary sources of transportation are a maglev subway system and the SkyTram, a network of ski-lift-like gondolas. Both are specially designed to accommodate disabled people. Citizens also use autonomous taxis, which they summon and pay for by smart phones.

Sociecity has a reliable local food supply: aquaponic farms. The farms generate nutritious food such as bluegill and romaine lettuce. The fish excrete nutrients that fertilize the aquaponic crops. Aquatic robots harvest the fish and crops, which are delivered on demand using drones.

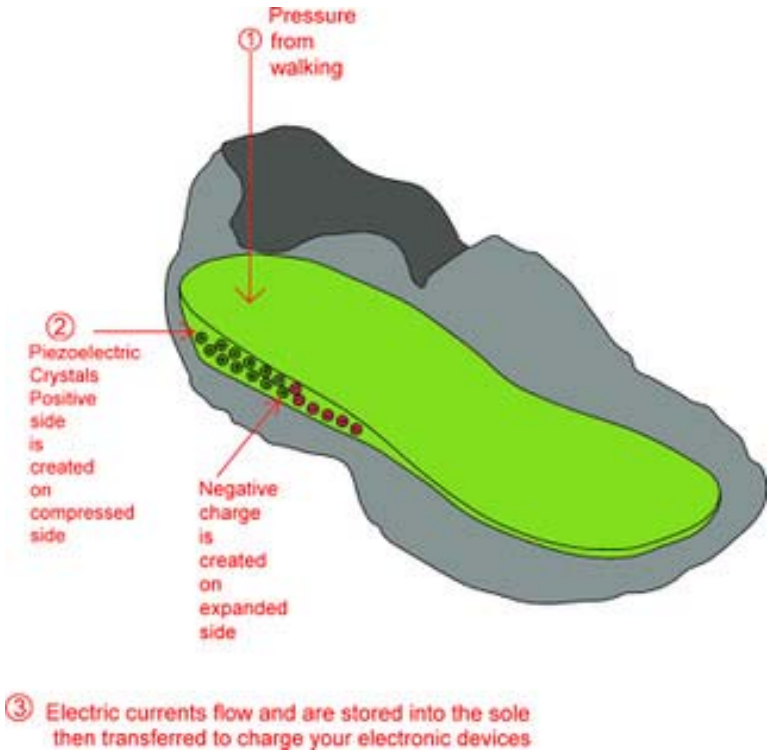
Sociecity has efficient city, health, and education services. Thermal and chemical sensors throughout the city alert the fire department of a gas leak or fire. Surveillance cameras along with AI software detect crimes in real-time and alert the police. Hospitals offer free health monitoring bracelets to all citizens. The bracelets track the user's health and will even notify hospitals in case of emergencies along with issuing an automated request for an EMS transport. One of the main draws of Sociecity is the prestigious education system. Teaching is enhanced by virtual reality, enabling field trips to historic sites and simulating laboratory experiments.

Another innovation of Sociecity is the Cyclesphere, a personal recreational vehicle about 2.1 meters in diameter. A Cyclesphere is operated by peddling a generator inside it to produce electricity, powering superconducting electromagnets to drive the sphere forward while the seating section remains level. Each Cyclesphere seats up to four people and functions safely in all weather, including snow. Some spheres are battery powered and have accommodations for elderly and disabled citizens. Cyclespheres are a fun and safe way for citizens to enjoy the outdoors.



4-person Cyclesphere

One unique technological advancement in Sociecity is inexpensive, clean-energy footwear that gives citizens an incentive to exercise. SolePower™ insoles are constructed from a piezoelectric based material made from polyvinylidene fluoride (PVDF) that converts kinetic energy into electrical energy. The insoles generate 230mW per hour of walking and can charge the citizens' mobile devices wirelessly.



Back in 2055, Sociecity had terrible traffic congestion and unaffordable office space. The city council analyzed the jobs in the city and realized that 50% of the population could work from home. The city government collaborated with local businesses to set up a virtual reality system which enabled citizens to work remotely, but still allowed them to accomplish their tasks as if they were in an office. The plan was wildly successful, but, unfortunately, it caused two unintended side effects.

The first problem was that citizens were spending most of their time at home, since they used virtual reality for working, shopping, and entertainment. People were not having enough face-to-face interactions or getting enough exercise. The second problem was that since half of the citizens were working from home, many vacant structures and roadways littered the city landscape, such as office buildings and the main downtown highway.

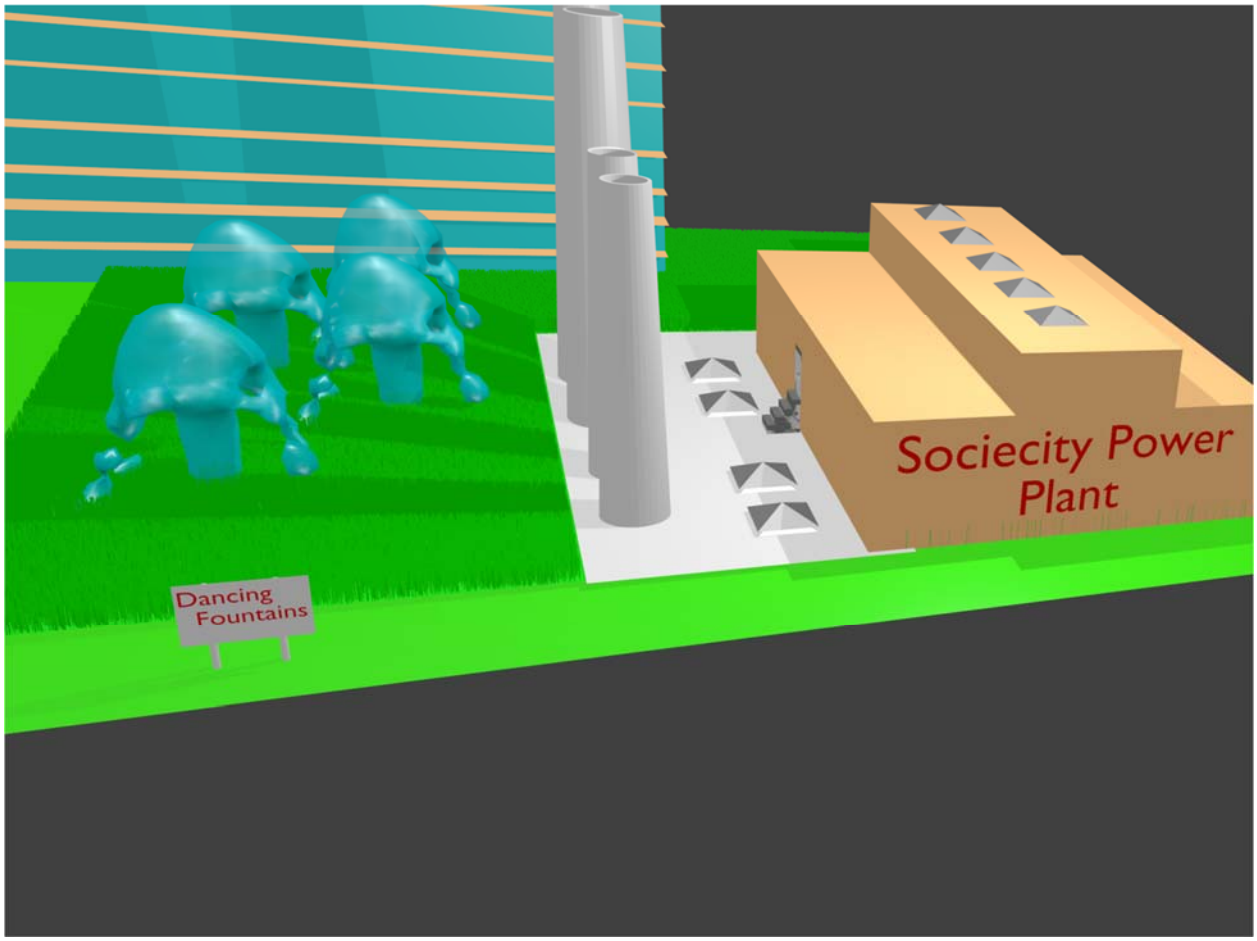
Using the engineering process, the city council brainstormed solutions. They decided to turn unused areas into public spaces specifically designed for interaction and exercise. A trial was conducted where several public spaces were built, and their effectiveness was evaluated by a consulting firm. The new public spaces were successful in getting people to interact and

exercise more but were expensive to build. The council iterated on the solution and came up with a more cost-effective approach.

The city council decided to partner with businesses such as *CycleSphere Inc.* and *FountainFun* to fund their public spaces. The city donates unused buildings and structures for the companies to use and provides tax incentives. The businesses advertise their products, sell merchandise, and hold events in the places that they fund, creating an ideal symbiotic relationship.

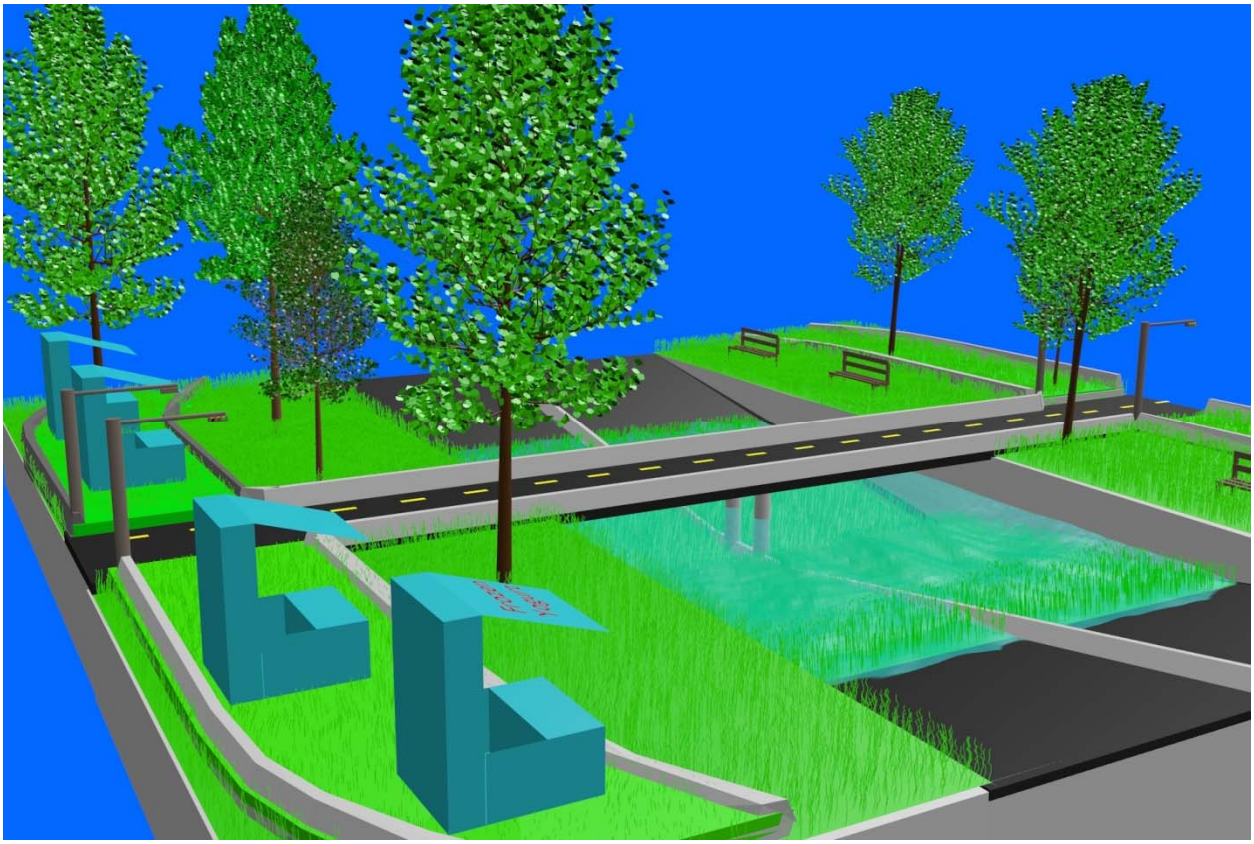
Two popular redeveloped public spaces are the Aquaponic Gardens and the Dancing Fountains. The Dancing Fountains complex has an outdoor amphitheater which hosts events and concerts. In the winter, the fountain area becomes an ice skating rink. To complement the exciting events taking place at the fountains, the Aquaponic Gardens offer a serene place to relax and enjoy nature. All of the public spaces in Sociecity are networked by the maglev subway and the SkyTram.

Forty years ago, the Dancing Fountain complex was actually an oil burning power plant. It was decommissioned and became a brownfield site filled with asbestos, lead paint, and PCBs. Originally, the city council planned to tear it down, but decided to redevelop it instead. Engineers reused existing parts, including the smoke stacks and boiler rooms. They even repurposed cooling weirs to collect rainwater from the tops of buildings and irrigate landscaping around the complex. Skylights gave natural light to the underground level. Now, the power plant is a multi-use complex including a gym, playground, pool, and shops. The Dancing Fountains plaza ties together the repurposed power plant and several nearby condo buildings.



Dancing Fountains Complex

The Aquaponic Gardens originated as an unused highway underpass which became a hangout for street gangs. The underpass was converted into an aquaponic farm where citizens enjoy nature. The connecting highway was repurposed into gardens, walking paths, and green space, and the area now has a host of food stands. A police substation was established nearby and uses the surveillance system to eliminate crime in the area.



Aquaponic Gardens

Transforming asphalt into green space created shady areas and increased evapotranspiration. This is the process of water evaporating from plants, which creates a cooling effect much like the way we sweat to cool ourselves. These changes reduced the “urban heat island” effect, dropping local temperatures by an average of 2.1° Celsius. The additional greenery also decreased air and noise pollution.

Events held at the Dancing Fountains allow citizens to meet people with whom they would not typically interact, which increases their sense of community. The various festivals held there also promote cultural diversity. These public spaces are successful in bringing people together and getting them out of their virtual reality bubbles.

Redeveloping these sites into public spaces had many technological challenges, the biggest hurdle being toxic cleanup. To make the Aquaponic Gardens viable to grow fish and crops, chemicals in the asphalt needed to be neutralized. This was accomplished through bioremediation, which is the process of using genetically modified microbes to break down toxins into harmless substances. Then, Geopolymer concrete was used to line the underpass to isolate any remaining contaminants. In a similar manner, bioremediation was applied to eradicate oil spills and PCBs in the power plant.

The development of the public spaces in Sociecity had tradeoffs and risks. The first tradeoff was whether to reuse existing structures or to bulldoze them and build anew. Reuse was restrictive, since the public places had to be designed around what previously existed. However, the city council decided to creatively redevelop the existing structures, saving construction costs and preserving the historical significance of the sites. Another tradeoff was

that when the city partnered with businesses, Sociecity gave up control over the public spaces. However, it was worth it in order to minimize the cost to the city, thus keeping taxes low.

One of the main risks of the public spaces in Sociecity is terrorist attacks. Since the spaces are designed to attract large numbers of people, they become prime targets for terrorists. To address this risk, Sociecity works with the FBI to identify suspects and uses the city's extensive surveillance network to detect threats and proactively neutralize them.

Many engineering disciplines were involved in the creation of new public spaces. First, environmental engineers ensured positive environmental impact of the new spaces. Microbial engineers developed the process for the toxic cleanup. Structural engineers designed foundations for the Dancing Fountain complex and the Aquaponic Gardens. The most important role was the municipal engineers who created the overall concept of the public spaces and designed how they would interface with the rest of the urban infrastructure.

The quality of life in Sociecity has greatly improved since the introduction of these public spaces. The citizens' health has improved because the public spaces encourage them to walk and Cyclesphere in their beautiful, thriving city. Citizens of all ages and cultures interact at concerts and other events, enhancing their sense of community. Whether it's listening to live music at the Dancing Fountains or fishing in the Aquaponic Gardens, there's always something fun to do in Sociecity.

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