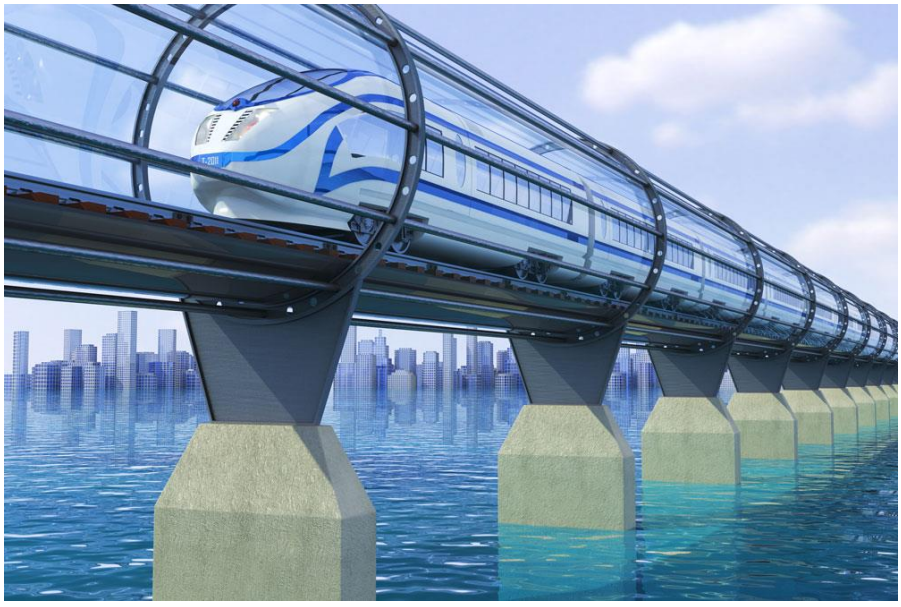
Paris 2.0

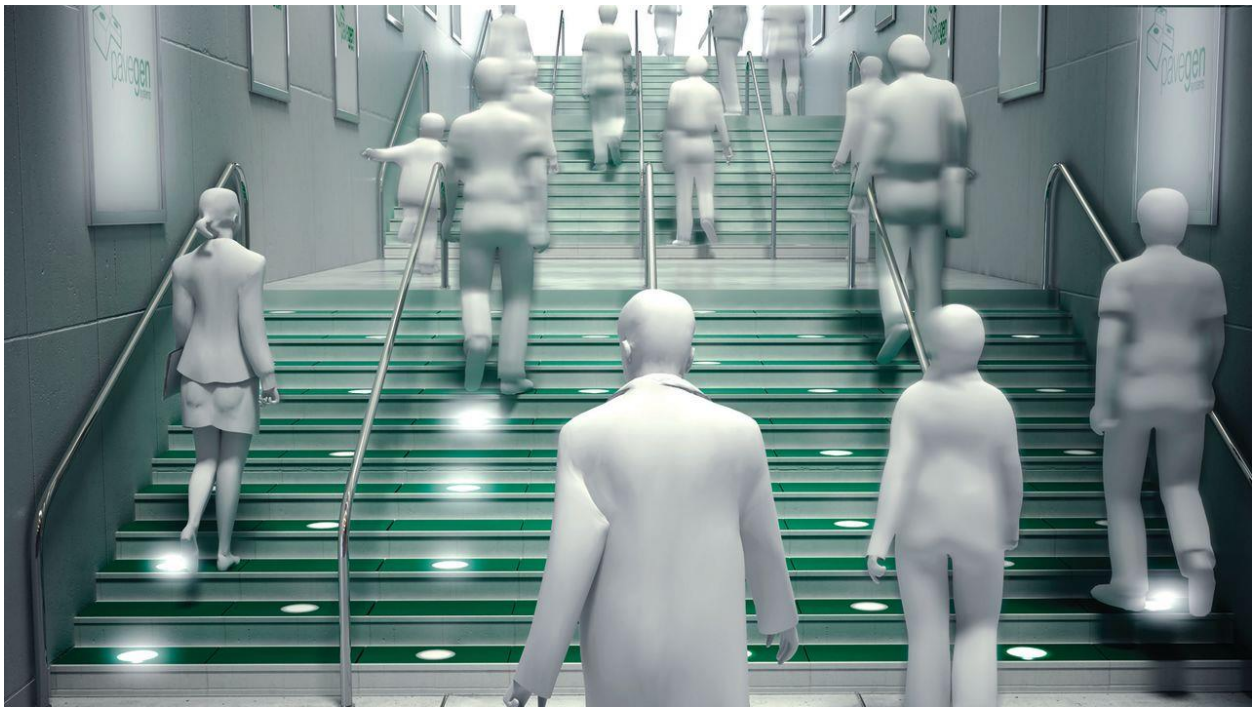
Paris' population started decreasing due to a severe mutation from the COVID-19 virus. The citizens created a new city from the ruins called Paris 2.0. At first, the death rate decreased gradually in the city. Once virtually everyone was vaccinated, new mutant variants occurred as a result of the vaccine. Birth rates dropped because of the adverse effects of the vaccine. After ten years, the death rate was eight times the birth rate. By 2055 population dropped to an all-time low of 55,000. Today in 2121, the population has grown to 15 million. With an average age of 45, citizens are active in community and family organizations. Citizens of all ethnicities enjoy the temperate climate due to its location close to the Atlantic Ocean. Temperature ranges from 36°F to 75°F. Because of the nice weather, tourists and citizens alike enjoy many outdoor activities. The area receives about 25 inches yearly. Paris 2.0 sits on the River Seine with flat plains and rolling hills located to the north and mountains, including the Pyrenees and Massif Central mountains.

Before the pandemic, Paris represented the foremost center for arts, trade, and learning. Today, we celebrate the return as a world leader in fashion, arts, and education. Fashion week draws merchants from all over the world to discover new trends. Even the fashion runways feature energy-producing kinetic tiles, generating enough electricity to light the entire building. While the average citizen may not be involved in Fashion week, businesses report about one-third of their revenue comes from tourists and business people during this week.



The mechanical engineers designed hyperloop trains consisting of capsule pods using electric engines, magnetic levitation, virtually eliminating frictions allowing trains to travel at over 1,000 miles per hour. Personal transportation includes flying cars, smart roads that

communicate with hydrogen fuel cell cars, and elevated cycle paths for motorcycles and segways.



Civil engineers incorporated kinetic tiles into all the sidewalks in town. Therefore, as the citizens walk on the tiles, they produce enough energy to power all the lights in the city. These sidewalks lead citizens to green spaces, work, home, and shopping. Many homes, factories, and businesses utilize these tiles generating more than fifty percent of the energy needed daily. Paris 2.0 uses solar power from traditional solar panels to modern floating solar farms on the Seine River, solar skins on rooftops and public transportation, and even solar fibers in clothing and roadways.

Single-family smart homes connect directly to the internet feature computer panels lining the walls. Homes link to the Paris Health Organization (PHO) to ensure all citizens are safe. Scientists and engineers created bricks from the old plastic waste, helping the change from a linear to a circular economy. Paris, like all other cities in the world in 2021, was a throw-away society. In 2060 the new government of Paris 2.0 established rules requiring any new building to meet guidelines for zero waste. Many citizens live in smart apartment buildings connected to the PHO, which monitors their health and wellness twenty-four hours a day. All citizens wear a personal health monitoring (PHM) band, sending data directly to the PHO. Alarms sound, sending emergency personnel by halo pods with needed assistance. Hospital personnel receives data directly from the PHM, based on individual needs. Advanced scanners located at the entrance instantly analyze bodies routing patients to the correct department.

Education features a futuristic digital pad project onto the walls of the classroom. Teachers monitor students through cameras, assisting as needed. Students spend six

to eight hours studying individualized assignments. Once students finish, a message is automatically sent for the family flying car to pick them up.

Before developing a circular economy, residents suffered many diseases due to polluted water, trash lining the streets, causing an infestation of rodents and insects. Carbon emissions caused thick smog blocking out most of the sunlight. High inflation caused by government mandates coupled with high unemployment left citizens ready for a change. They willingly moved from a linear economy to a circular economy with zero waste. The process did not happen overnight. First, the city eliminated the use of plastic. The Save Plastic Pollution company (SPP) developed special metal water bottles for each individual in the city. When new citizens move in, the SPP provides them with one of these special bottles. Citizens exchange them every six months for fresh bottles. SPP recycles the metal into new containers. If citizens would like to customize the bottles, they can pay extra. Biological engineers designed edible pods to hold both liquids and solid food replacing plastic bottles and takeout containers. Biodegradable or metal multiple-use straws replaced the once standard plastic straws. With advanced solar and kinetic energy technology, the city no longer needed to rely on fossil fuels.

Mechanical engineers stepped in to help keep products and materials in use by creating machines with interchangeable parts. Families rent significant appliances, with factories responsible for upkeep. As a result, manufacturers built devices with the idea of repair instead of trash. Textiles, including clothing, are rented, allowing more extended life once materials can no longer be reused or upcycled; the recycling center shreds for insulation for homes.

The benefits outweigh the risk of transforming from a linear economy to the circular economy found today in Paris 2.0. Citizens were reluctant to give up their convenient plastic bottles and single-use containers, but with the help of biological engineers, water pods and edible food containers became the norm. While citizens embraced the use of kinetic energy sidewalks, the installation cost was astronomical. Critics were concerned that the cost far exceeded the benefits of cleaner air. Manufactures and businesses traded off the profits from selling their goods outright to renting and repairing the machines for longer life, saving precious materials.

The clean-up and recycling program benefited the city since Paris 2.0 suffered from excessive trash issues, including hazardous chemicals. As a result, citizens were eager to do their part in the new circular economy.

Word Count 999

References

Ashok, S.. "solar energy". *Encyclopedia Britannica*, 22 Oct. 2021, https://www.britannica.com/science/solar-energy. Accessed 12 November 2021.

“Discover the Enthralling History of Paris.” *World Travel Guide*, http://wtgtravelguide, https://www.worldtravelguide.net/guides/europe/france/paris/history/. Accessed 12 Nov. 2021.

“Eco-Friendly Construction Blocks Made from Plastic Waste | Design Indaba.” *Design Indaba*, https://www.designindaba.com/articles/creative-work/eco-friendly-construction-blocks-made-plastic-waste. Accessed 12 Nov. 2021.

“E-Learning And Futuristic Education Technology Concept With Little School Boy Using Digital Hud Interface And Icons. (Image With Mixed Digital Effects) Stock Photo, Picture, And Royalty Free Image. Image 86031204.” *123RF*, https://www.123rf.com/photo_86031204_e-learning-and-futuristic-education-technology-concept-with-little-school-boy-using-digital-hud-inte.html. Accessed 12 Nov. 2021.

“Green Sidewalk Makes Electricity -- One Footstep at a Time | CNN Business.” *CNN*, CNN, 13 Oct. 2011, https://www.cnn.com/2011/10/13/tech/innovation/pavegen-kinetic-pavements/index.html.

History.com Editors. “Paris Celebrates 2,000th Birthday.” *HISTORY*, A&E Television Networks, 6 July 2020, https://www.history.com/this-day-in-history/paris-celebrates-2000th-birthday.

“How Does Solar Work? | Department of Energy.” *Energy.Gov*, https://www.energy.gov/eere/solar/how-does-solar-work. Accessed 12 Nov. 2021.

“Potential and Kinetic Energy Explained.” *Tara Energy*, 19 Nov. 2020, https://taraenergy.com/blog/potential-and-kinetic-energy-explained/.

“The Future of Computing (and Website) Speed.” *Apica*, 19 Aug. 2014, https://www.apica.io/blog/future-computing-website-speed/.

“Virgin Hyperloop.” *Virgin Hyperloop*, https://virginhyperloop.com/. Accessed 12 Nov. 2021.

Tokyo 2.0

Tokyo, Japan, is a beautiful, blissful land located at 35.6762 N, 139.6503 E on Tokyo Bay. It is the capital of Japan and was initially named Edo, which means Eastern Capital. The population has continued to grow over the centuries and now is home to nearly 75 million people. Citizens of all ethnicities enjoy mild summers with high temperatures reaching only 87°F. Since Tokyo is protected from the cold Siberian winds in the winter, most days are sunny with lows in the mid 30°F. Each year the city receives 60 inches of rain, with the majority in the warmer summer months.

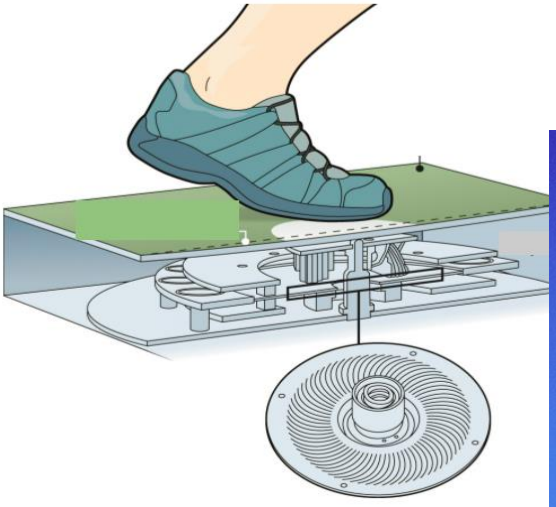
Tokyo boasts cutting-edge technology, making life safe and easy for the citizens. Robots are used in factories to eliminate dangerous jobs. Citizens no longer perform hazardous tasks. Healthcare offers contact lenses that monitor vital signs. Once they only monitor glucose levels, today they monitor all vital signs and report to the central dispatch station. When aid is needed, emergency medical personnel respond. No longer do citizens have to carry phones; they built them into their glasses. This concept began in 2011 with Google Glasses. Today in 2121, these glasses have replaced the traditional cell phone and laptop computers. Everyone is constantly connected to the central hub through glasses.

.

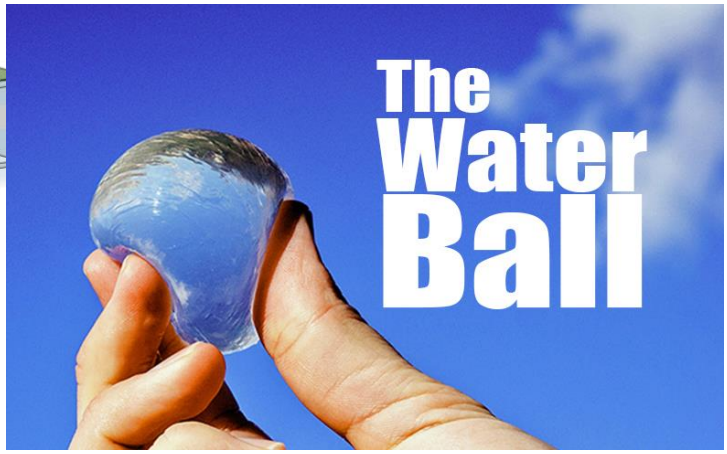
Transportation in Tokyo 2.0 features are flying cars, passenger drones, and personal jetpacks. Many choose to ride a bike or walk whenever possible. The family car folds up into a briefcase, then taken into the workplace. Public transportation consists of super-fast trains and sky trams powered by solar power. Sidewalks utilize kinetic energy

tiles that collect energy every time citizens walk by. People can also find these tiles in many public and private buildings.

Education offers state-of-the-art technology, including augmented reality (AR), to explore inside the body or go inside a volcano. Based on ideas developed by NASA, future scientists can study the galaxy using AR just like they are out in space. The planets appear around them. Biology students use AR to go inside a germ to check how it reacts. Students are motivated to be part of the technology revolution.



In 2050 Tokyo 2.0 began the transformation from a linear economy to a circular economy. Back in 2021,



use once then send to trash dump was common. Engineers, Biotechs, and Chemists developed biodegradable packaging eliminating wasteful containers. At first, citizens were reluctant to make the switch. Over time engineers eliminated plastic waste. Milk, water, and soda come in edible balls. Instead of replacing shoes, they take them to the repair shop. Parents rent baby clothes since children outgrow them quickly. When it is time, they return the clothes for the next size. Engineers replaced the pantry with a computer system capable of printing any food citizens wanted. Food items can be printed from the home 3D printer eliminating wasting food.

Tokyo's Central Power Plant, a waste-to-energy plant that burns all the municipal solid waste, preventing it from ending up in the trash dump. The plant uses the steam created to turn a generator, creating electricity. In the past, energy production utilized only 87% of solid waste. Now, they use 100% helping to create a waste-free future. Outsiders may think that "power plants cause pollution," but filters capture the fly ash in the baghouse. Line and sodium hydroxide clean the acidic combustion gasses. As a result, the fumes that come out of the top of the power plant contain clean air.

At the Donation Center, citizens of Tokyo donate their used items such as clothes, toys, and other used household items. Citizens can select what they need or trade their unwanted items for others. Community Centers established clothing swap meets, making it easy to reuse gently worn items instead of sending them to the landfill. Additionally, the Community Center also has a food donation area. If unable to be reused, it is sent to the Recycling Center to become new products.

Engineers and city planners built Vertical Greenhouses in each neighborhood that uses filter gray water to meet the plants' needs. Compost supplies rich soil to grow vegetation. The greenhouse utilizes animal waste for fertilizer. Engineers designed green spaces that include a community park complete with kinetic sidewalks. These sidewalks generate energy to light the parks and streets in each neighborhood. The park has beautiful cherry trees and fountains in the center of each park. Bamboo benches provide seating for enjoying the view. Families enjoy riding bikes, walking their dogs, picnics, and playing games in the parks.

While most people live in apartment buildings or condos, several single-family homes exist. Like the other new buildings, apartments use recycled metals, bamboo, and recycled material, including boards made from recycled orange pulp and insulation derived from unusable textiles. Most buildings have a community garden on the roof, which aids in providing oxygen, food and cools the building. The traditional family home consists of four stories. Homes have solar panels on the top, along with thick insulation created from recycled fibers from textiles. Bamboo, along with building materials manufactured from recycled materials, is used in home construction.

While there were many trade-offs, including giving up the convenient single-serving plastic containers and retraining the way citizens travel, the transition from a linear economy to a circular economy is second nature now to everyone. With the elimination of plastic single-use items, scientists created biodegradable packaging. The environment benefits greatly from the elimination of unnecessary packaging.

Many engineering disciplines were involved in the creation of a new circular economy. Environmental engineers ensured the positive impact of the city by providing green spaces with kinetic sidewalks for beauty and function. Microbial engineers developed

biodegradable containers. Structural engineers designed buildings utilizing recycled materials and fast-growing bamboo. The most important role was the municipal engineers who created the overall concept of the public transportation system using all green energy. Computer engineers designed the public safety system and the AR educational system to interface with the urban infrastructure. Visit Tokyo 2.0. It's amazing.
Word count 1000
Works Cited

Adainoo, Bezalel. "How Food Waste Is Engineered into Useful Products in a Circular Economy | Engineering For Change." *Engineering For Change*, Engineering For Change, 2 Sept. 2020, https://www.engineeringforchange.org/news/food-waste-engineered-useful-products-circular-economy/.

Dyson, Lisa. "Lisa Dyson: A Forgotten Space Age Technology Could Change How We Grow Food | TED Talk Subtitles and Transcript | TED." *TED: Ideas Worth Spreading*, https://www.ted.com/talks/lisa_dyson_a_forgotten_space_age_technology_could_change_how_we_grow_food/transcript?language=en. Accessed 13 Nov. 2021.

"Five Ways to Make Cities Healthier and More Sustainable | FAO Stories | Food and Agriculture Organization of the United Nations." *Food and Agriculture Organization of the United Nations*, http://www.fao.org/fao-stories/article/en/c/1260457/. Accessed 13 Nov. 2021.

"Green Apartment Design with Vertical Forest That Has More 18000 Plants." *PT NIKI FOUR*, https://www.facebook.com/nikifour, 16 Jan. 2017, https://nikifour.co.id/green-apartment-design/.

"Hybrid Plane Images, Stock Photos & Vectors | Shutterstock." *Stock Images, Photos, Vectors, Video, and Music | Shutterstock*, https://www.shutterstock.com/search/hybrid+plane. Accessed 13 Nov. 2021.

"Innovative Ways to Create More Urban Green Spaces - Project Learning Tree." *Project Learning Tree*, https://www.plt.org/educator-tips/urban-green-spaces/. Accessed 13 Nov. 2021.

"Is Your Company Ready for the Circular Economy?" *Harvard Business Review*, https://www.facebook.com/HBR, 25 Jan. 2013, https://hbr.org/2013/01/is-your-company-ready-for-the.

“Meet the Entrepreneur Turning Your Footsteps into Energy - Reader’s Digest.” *Reader’s Digest: Online Magazine, Competitions and More*, Reader's Digest, https://www.readersdigest.co.uk/lifestyle/technology/meet-the-entrepreneur-turning-your-footsteps-into-energy. Accessed 13 Nov. 2021.

Project, EcoMastery. *7 Innovative Sustainable City Projects to Make Cities More Sustainable*. YouTube, 31 Mar. 2021, https://www.youtube.com/watch?v=qex92Jt5JOw.

“Renewable Energy Explained - U.S. Energy Information Administration (EIA).” *Homepage - U.S. Energy Information Administration (EIA)*, https://www.eia.gov/energyexplained/renewable-sources/. Accessed 13 Nov. 2021.

“The Water Ball. Is It a Game Changer? - Active Water Coolers.” *Active Water Coolers*, https://www.facebook.com/activewatercoolers/, 18 Apr. 2019, https://www.activewatercoolers.co.uk/2019/04/18/the-water-ball-is-it-a-game-changer/.

“Tokyo Climate: Weather by Month, Temperature, Precipitation, When to Go.” *Climates to Travel - World Climate Guide*, https://www.climatestotravel.com/climate/japan/tokyo. Accessed 13 Nov. 2021.

“Tokyo Geography.” *Tokyo and Only Tokyo!*, https://tokyo-tokyo.com/tokyo_geography.htm. Accessed 13 Nov. 2021.

“---.” *Tokyo and Only Tokyo!*, https://tokyo-tokyo.com/tokyo_geography.htm. Accessed 13 Nov. 2021.

“Waste-to-Energy (MSW) in Depth - U.S. Energy Information Administration (EIA).” *Homepage - U.S. Energy Information Administration (EIA)*, https://www.eia.gov/energyexplained/biomass/waste-to-energy-in-depth.php#:~:text=Waste%2Dto%2Denergy%20plants%20burn,is%20used%20to%20generate%20electricity.&text=For%20every%20100%20pounds%20of,as%20fuel%20to%20generate%20electricity. Accessed 13 Nov. 2021.

“---.” *Homepage - U.S. Energy Information Administration (EIA)*, https://www.eia.gov/energyexplained/biomass/waste-to-energy-in-depth.php#:~:text=Waste%2Dto%2Denergy%20plants%20burn,is%20used%20to%20generate%20electricity.&text=For%20every%20100%20pounds%20of,as%20fuel%20to%20generate%20electricity. Accessed 13 Nov. 2021.

“What Are the Different Types of Land Zoning | Millman National Land Services.” *Millman Land*, 7 Nov. 2020, https://millmanland.com/knowledge/what-are-the-different-types-of-land-zoning/.

“What Is a Circular Economy? | Ellen MacArthur Foundation.” *How to Build a Circular Economy | Ellen MacArthur Foundation*, https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview. Accessed 13 Nov. 2021.

Ather: Waste-Free City of the Future

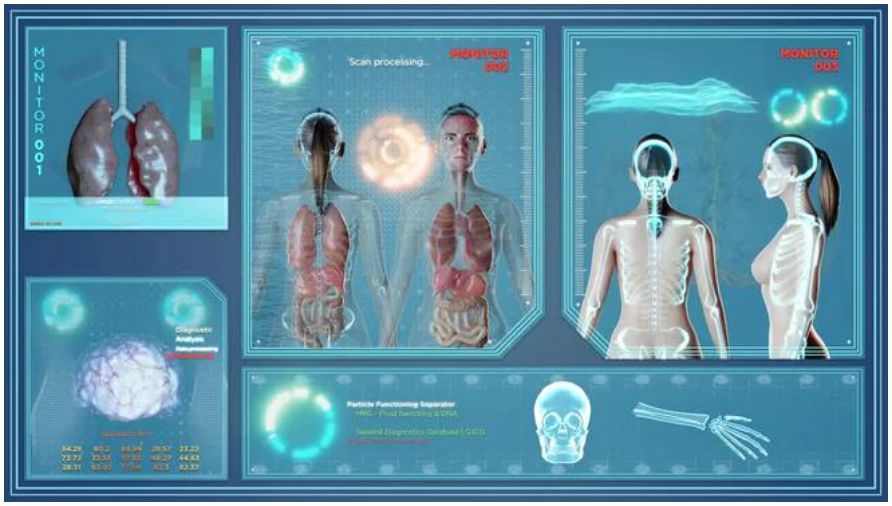
Ather replaced London in 2055, creating a breathtaking artificial island located at 51.5072° N, 0.1276° W along the southeastern part of the British Islands. The Thames River remains the best-known natural feature of Ather. The engineers and architects planned a city to replace the dilapidated city of London. Before, a linear economy and a throwaway society resulted in excessive waste and pollution. Their goal was for Ather to become a clean and green city that eliminated waste, created a circular economy, and solved the flooding problem. Metal beams form the foundation for the new city that now towers over the rugged landscape. The civil engineers incorporated a HyperLoop using advanced solar panels that collect energy even on cloudy days. In 2099, Ather gained the title of Best City in the World, resulting in a massive increase in population. Today, in 2121, the population is 45.5 million, with an average age of 35. Citizens represent many ethnicities and cultures from around the world. The temperature ranges between 35°F to 85°F. To overcome the long cold winters, scientists developed temperature sensors found in thermal regulation clothing, providing the ideal temperature for all. Not only does clothing help regulate temperature, but it can also generate electricity through the solar filaments powering personal electronic devices and providing energy while on the go.

Engineers sought to preserve as many features as possible, including Westminster Abby, Big Ben, and the Tower Bridge, which remains in its original location over the Thames River. Tourism remains one of the most profitable sectors of the economy.

Transportation around the city utilizes the hypertubes that rely on solar energy and electromagnetic force that levitates the vehicle to the top of the vacuum tube. They use

self-propelled personal pods powered by kinetic energy. When the driver presses the accelerator or the brake, energy is stored in the battery to power the car.

A separate hyperloop connects emergency responders (EMA) to all areas of the city.



Hospitals utilize kinetic energy generated as people walk through special tiles. Each zone contains an emergency facility to provide swift services when needed. Citizens wear a bracelet that monitors their vital signs 24/7. Scanners are located throughout the city to conduct body scans. If the EMA detects a problem, medical personnel are dispatched for treatment. Often, issues are caught before symptoms appear.

Parents choose either virtual or traditional schools located within walking distance from home. Augmented reality and holographic capability allow students to experience how to perform surgery or build a rocket in a virtual setting that was once only able to read

about in a book or watch a video to learn. Of course, there are still traditional books for those who love the feel of a book in their hand when they read.

Jobs once unheard, including pharmer who raised engineered crops in vertical gardens strategically placed in each zone. Civil engineers designed a water purification system that utilizes greywater to water plants in the vertical gardens. Regenerative Change officer sought methods beyond sustainability, making the world a better place. They create products and services aimed to eliminate poverty and hunger, prevent wars, and balance climate change with the needs of humanity. Also, experts in AI and robotics design intelligent machines to take over monotonous and dangerous jobs, replacing them with automotive assembly systems.

Homes in Ather will be green, intelligent, high-performance, and organic. Builders utilize bamboo-based products, which quickly regrow. Mycelium fibers from mushrooms and other organic material, including waste from the orange juice factory, become insulation, furniture, and cabinets. Roofs have solar panels to capture the energy from the sun. Other roofs will feature green scape where vegetated roofs incorporate a waterproof membrane, growing medium, and vegetation overlying a traditional roof providing food, clean air, and offer insulation from heat and cold.

Ather city planners began transitioning from a linear to a circular economy by establishing a citywide recycling program. First, they utilized curbside containers to collect the recyclable. Trucks transported the containers to the recycling centers. Engineers sought alternative ways of transporting waste. In 2050 they developed underground hypertubes linking businesses and homes to the recycling center. Scientists developed a low-pressure vacuum environment allowing airlocks to open in each facility. Citizens fill Hyperpods with waste, sending it to the recycling center where automated robots sort the material, routing it to the correct department for reuse or recycling.

Bioengineers worked with chemists to develop biodegradable food containers. Often, the food containers made of edible material eliminate waste. Citizens do not use plastic; everyone has either refillable metal or glass containers. Clothing is no longer disposed of but shared through clothing exchange in each neighborhood. When citizens can no

longer reuse textiles, they are recycled into fibers and spun into new clothing items or used as insulation, carpet padding, or even in the auto industry.
Mechanical engineers designed personal transportation pods that utilize solar and kinetic energy with interchange parts. Therefore, citizens simply replace the malfunctioning parts. In addition to the hyperloop, public transportation includes scooters, mini cars, and jetpacks.
Instead of throwing out food, restaurants and stores donate unused food to shelters for distribution to the needy. 3D food printing stations in homes allow individuals to print out a quick meal at the push of a button. Many paper products utilize bamboo as well as recycled paper. Biodegradable, Earth-friendly detergents replace harsh chemicals. While the convenience of a disposable society no longer exists, citizens are happy to do their part to take care of the environment. Life has slowed down where families have more time to enjoy each other. Citizens have learned how to grow, harvest, and can their food as their ancestors did before the fast-paced disposable era. While the tradeoffs were hard at first, citizens realized the benefits far outweigh the risks. The 22nd-century citizens love the return to a more Earth-friendly lifestyle, where they walk to work. Without a doubt, anyone would enjoy living in Ather.

Word Count 992

Works Cited

Alexander, Donovan. “15 Futuristic Jobs To Be Common in the Next Few Decades | IE.” *Interesting Engineering*, Interesting Engineering, 2 Oct. 2020, https://interestingengineering.com/15-futuristic-jobs-that-will-be-common-in-the-next-few-decades.

---. “15 Futuristic Jobs To Be Common in the Next Few Decades | IE.” *Interesting Engineering*, Interesting Engineering, 2 Oct. 2020, https://interestingengineering.com/15-futuristic-jobs-that-will-be-common-in-the-next-few-decades.

“Futuristic Medical Laboratory - Stock Motion Graphics | Motion Array.” *The All-in-One Video & Filmmakers Platform | Motion Array*, https://motionarray.com/stock-motion-graphics/futuristic-medical-laboratory-748335/. Accessed 12 Nov. 2021.

Hart, Spencer. “4 Futuristic Transport Methods That Will Change How We Travel around the World | T3.” *T3*, T3, 12 Aug. 2018, https://www.t3.com/us/features/4-futuristic-transport-methods-changing-how-we-travel-around-the-world.

“Kinetic Energy Is All around - Tomorrow Unlocked.” *Tomorrow Unlocked*, 7 Aug. 2021, https://www.tomorrowunlocked.com/kinetic-energy-future-power-source/.
Liez, Kareen. “15 Unbelievably Amazing Futuristic House Designs | Home Design Lover.” *Home Design Lover*, https://www.facebook.com/homedesignlover, 9 May 2013, https://homedesignlover.com/architecture/futuristic-house-designs/.

---. “15 Unbelievably Amazing Futuristic House Designs | Home Design Lover.” *Home Design Lover*, https://www.facebook.com/homedesignlover, 9 May 2013, https://homedesignlover.com/architecture/futuristic-house-designs/.

“London Historic Sites: 10Best Historic Site Reviews.” *10Best*, https://www.facebook.com/10best, 10 May 2013, https://www.10best.com/destinations/uk-england/london/attractions/historic-sites/.

“New Development to Utilise Augmented Reality Technology for Medicine.” *Immersive Technology*, 3 Jan. 2020, https://immersive-technology.com/augmentedreality/new-development-to-utilise-augmented-reality-technology-for-medicine/.
Sandhu, Jagpreet. “The 5 Most Exciting New Solar Panel Technologies in 2021.” *Solar Reviews*, Solar Reviews, 28 June 2019, https://www.solarreviews.com/blog/solar-panel-technologies-that-will-revolutionize-energy-production.

---. “The 5 Most Exciting New Solar Panel Technologies in 2021.” *Solar Reviews*, Solar Reviews, 28 June 2019, https://www.solarreviews.com/blog/solar-panel-technologies-that-will-revolutionize-energy-production.

Schiffer, Jessica. “Solar-Powered Clothing: Everything You Need to Know | Who What Wear.” *Who What Wear*, Who What Wear, 14 July 2016, https://www.whowhatwear.com/solar-powered-clothing/slide2.

---. “Solar-Powered Clothing: Everything You Need to Know | Who What Wear.” *Who What Wear*, Who What Wear, 14 July 2016, https://www.whowhatwear.com/solar-powered-clothing/slide2.

“Solar-Powered Everything - Nexus Media News.” *Nexus Media News*, https://www.facebook.com/nexusmedianews, 6 Mar. 2017, https://nexusmedianews.com/solar-powered-everything-7fd92b9d35a/.

Circulus

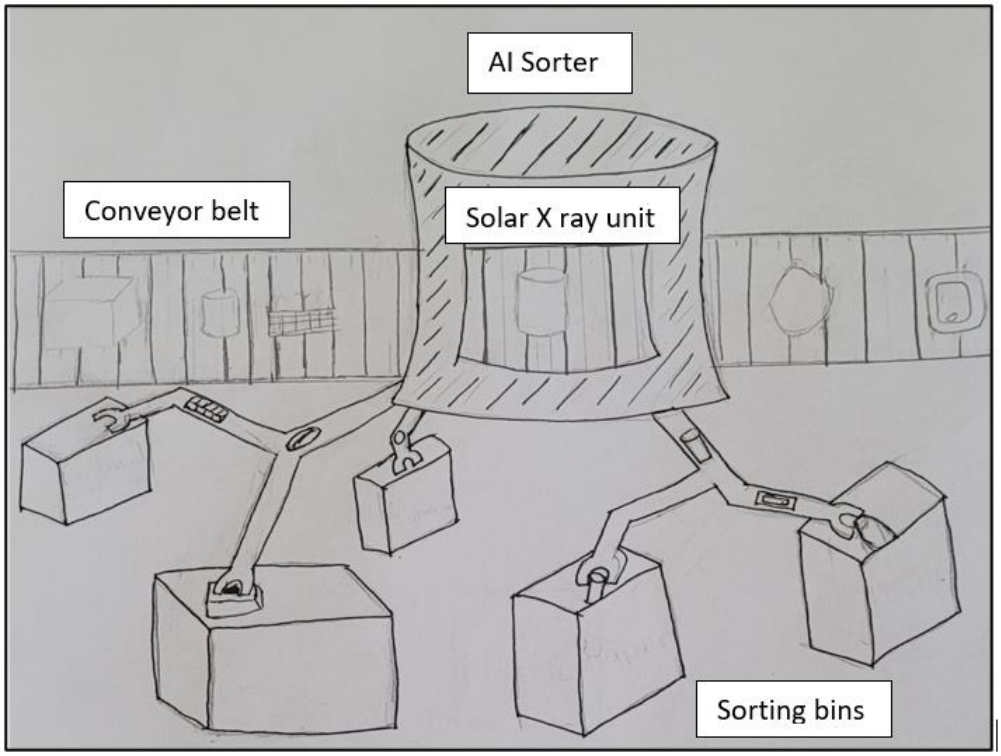
Barton Creek Elementary - Fifth Grade

Circulus, our waste free city is near Los Angeles (LA), California at about 34° N, 118° W. Circulus is one of the most populated cities west of the Mississippi River and has a population of about 1 million. It is also a popular tourist place with its warm weather and sunny beaches. The city is blessed to have good access to water and strong sunlight. Due to its proximity to LA, it is home to plenty of businesses and traffic. It is 4 hours away from Apex Regional Landfill, the largest landfill in the country. The landfill is spread across 2,200 acres and receives about 58,000 tons of waste per day. The smog from the landfill created pollution for our city and we needed to save our beaches.

Location of Circulus

We made new goals for our city to protect our health. Our city goal was to produce no waste, no pollution and keep products in use for a longer time. Our architects planned for us to live, work, eat and play locally so people did not have to spend fuel moving goods. A short food chain provided healthy food for the people. Kitchen waste is turned to organic compost for growing food organically. Our main problem though was that two-thirds of our waste was from consumer goods. So, electronics and clothes were chosen as the first two categories to innovate because of the high environmental impact per weight of product and the quick use and throw time of these products.As use of electronics grew, so did

our waste and carbon emissions. The materials required to produce electronics were getting scarce. The microchip shortage made us struggle to meet demand. At that time, city council decided that repairs must be easy, inexpensive and all electronics were to be used, repaired, re-used and recycled. Our electronic engineers built “Xilium” the sorter, which uses Artificial Intelligence (AI) technology and solar X-ray machines to sort through the items on the conveyor belt depending on mass, usage, shape, material composition and weight of the item. Our engineers built substitutable designs into electronics. Defective parts from electronics are swapped out and then renewed for use. This way the whole device is not thrown out. Our autonomous electric pickups collect consumer goods based on weight and we get discount coupons for it. Our sales teams has a ‘repairability score’ which informs people on how easily devices are repairable. Buying devices with high repair score has no tax. Leasing was also introduced where the electronic device is returned to the business at the end of a rent period. City council taxes the use of new raw materials in a product. This encourages businesses to claim back all of the raw materials in their products and renew them for reuse. We use solar 3D printers to create parts for broken products and repair other items for reuse. The remaining plastic waste that is not reusable is sorted by color and then melted and fed to the 3D printers. This way we keep material in circulation for as long as possible. Our city bans single use products like plastic bags and water bottles. Employers who ask their employees to use one phone for personal and office work are taxed less.



Xilium: The sorter

Our sorting and artificial intelligence technology also helps in separation of clothes. The quality of a clothing decreases when it ends up in general landfill waste. 75% of separated clothing is re-worn in our city. The rest is processed into cleaning cloths or insulation material. Making a pair of jeans takes 7000 liters of water. Now discarded jeans are repurposed back to jeans or used as home insulators. Denim scraps and jeans are processed into fibers. Then, the fibers are treated with borax to make them fire and mold resistant. Though it takes about 500 pairs of jeans to fully insulate a house, it is worth it because it's 100% recyclable. We were able to use water more efficiently and also reuse clothes at the local level. This reduced the use of new raw materials and diverted fast fashion clothes from going into Apex landfill.

The risk with this technology was that it can't sort contaminated goods like lead or mercury mixed with other metals. Certain dyes used for textiles made them unrecyclable and our sorting technology didn't know to segregate such material. The trade off was we had to use alternate materials to avoid this problem. We realized that these materials shouldn't be collected or stored together because the contamination levels are higher.

Creating a place where people can live, work and play locally was good for the health of our people and also environment. Our beaches are so much cleaner and safer for marine life and tourists from all over the country enjoy coming to our city.

Words = 946

Resources:

Fairs, Marcus. "Interview with Ellen MacArthur." Web. 11 June 2019, https://www.dezeen.com/2019/06/11/ellen-macarthur-circular-economy-designers/.

"Making nature-positive food the norm.", Web. Ellen MacArthur Foundation, https://ellenmacarthurfoundation.org/resources/food-redesign/overview.

"Better than recycling? These manufacturers are taking part in a 'circular economy. " Web. 30 Sept 2021, https://www.marketwatch.com/story/a-better-way-than-recycling-these-manufacturers-are-taking-part-in-a-circular-economy-11633613962.

"Collection – the foundation for flexible packaging's circular economy." Web. 7 Oct. 2021, https://packagingeurope.com/collection-foundation-for-flexible-packaging-circularity/.

"Circular Economy" Web, https://sustainability.aboutamazon.com/environment/circular-economy

"The circular economy action agenda for electronics." Web. PACE, June 2018, https://pacecircular.org/action-agenda/electronics.

Patel, Prachi. "Quick, efficient way to turn food into fuel." Web. June. 29, 2017, https://www.anthropocenemagazine.org/2017/06/quick-efficient-way-to-turn-food-into-fuel/.

"Tech Solutions to Reduce Food Waste: Food and Tech Series." Web. 6 August. 2019, https://www.nycfoodpolicy.org/food-and-tech-solutions-to-prevent-reduce-food-waste/.

Marjolaine. "Turning food waste into energy to Power homes." Web, 29 Jan 2021, https://www.biogasworld.com/news/turning-food-waste-into-energy-to-power-homes/.

Chatterji, Mo. "Repairing-not recycling is the first step to tackling e-waste." Web. 19 Jul 2021, https://www.weforum.org/agenda/2021/07/repair-not-recycle-tackle-ewaste-circular-economy-smartphones/.