14. Infrastructure Improvements

All public service delivery infrastructure has been replaced in cities and urban areas. Electricity, sewer, clean water, storm water and communication network facilities are buried underground, in smart, efficient new configurations with more than 100 year expected lives, so streets and former streets are no longer being dug up constantly. There are no longer ugly utility poles and wires everywhere.

Toilet sewage has dedicated pipe networks to treatment facilities, where it's made into organic fertilizer or burned as biomass for energy. We use water instead of toilet paper now, and there are no more garbage disposals in sinks. Organic matter is processed through composting systems, most used locally in gardens. We no longer use toxic chemicals in cleaning, bathroom or household supplies, so separate piping networks from clean used shower, bathroom and kitchen uses distribute that water for reuse in gardens or reprocess and redistribute it as drinking water. No chemicals are used in drinking water, which rely on filters, UV light and "good energy" treatments instead.

The simple change of eliminating toilet paper use has had extraordinary positive benefits. In 2020, humans used 3 billion kilometers of toilet paper per year, at a rate equivalent to stringing it around the equator every 2 minutes, or to the sun and back every 10 days. We cut down half a billion trees per year and used ¾ of a billion tons of water, 50 million tons of oil per year to make, transport and process it. All of that harmed our environments and life-support systems, harms that have been eliminated.

Bidets are common, and often integrated into toilets. Simple and cheap adapters screw into standard toilet water supplies, providing us controllable, jetted water hoses beside toilets. When we use toilets, we clean ourselves with water and wash our hands. That very simple change had a major effect on reducing global warming and environmental harms. It vastly reduces plumbing and sewage system problems, and the processing of waste water and sewage into reusable water and natural fertilizers. Nothing goes into toilets that does not come from our bodies. There's no inconvenience to this change.

There has been a massive effort to upgrade or replace school facilities, which are now universally considered more than adequate in the U.S., and all schools have state-of-the-art information and communications technologies and network access to support the distribution and delivery of exceptional free education content. Classroom layouts are no longer desks facing talking-head teachers.

Many rooms are dedicated to a variety of individual and group learning centers, where students learn from world-class presenters, media, simulations, videos, games and other content. Others are dedicated to group projects, where teachers help students understand the relevance of what they are learning with real-world applications of knowledge and skills. Most schools include "edible school yard" gardens, where students work to apply learning, grow and prepare food and learn about living systems. First-rate facilities are available for vastly expanded art, music, athletic, quiet-time and play options.

Great progress has been made with levee and dam systems. Rising sea levels and increasing storm events made it necessary to upgrade and build new levee and water diversion systems for many city and urban areas. In other areas, improved understanding of natural life support systems led us to tear down levees and allow periodic flooding for the environmental improvements from those seasonal events, which had previously been poorly understood or ignored. Thousands of dams have been torn down, replaced or repaired. Thousands of dams, canals and levees still need work, which will take many years

to really dial in as sustainable systems, and may involve relocating hundreds of thousands of people. We're still learning how natural systems work, and how we have messed them up.

As much as two-thirds of what had been paved areas in cities and urban areas are now essentially parks, planted and lit subtly and beautifully, with ample walking and biking options. Many bridges and former highway overpasses are now beautiful parks, and so are most high-rise rooftops. Eliminating personal vehicles from bridges has hugely reduced loads they carry, so many that used to be critically stressed with previous loads are now adequate for reduced load train, gondola and elevated park uses.

Areas devoted to wilderness have increased, as appreciation of the need for areas preserved from damage by human activity has increased. Many areas below current and former dams and levees are allowed seasonal flooding and have been converted to parklands. Use of parks has increased hugely, because we have more time for that and increased appreciation for the value of time spent in nature. All parks are better maintained and managed. There are no private vehicles or their pollution in parks.

Garbage production and land devoted to landfills has been reduced by about two-thirds in the U.S. People are consuming much less, and there are much less plastics and dangerous chemicals and toxins in what people do consume that end up in landfills and environments. Recycling has greatly improved. More importantly, perhaps, so has reuse. Liquids are now typically distributed in standard glass bottles that are returned to manufacturers, washed, refilled and redistributed. Most plastics are now illegal. Manufacturers are required to take back all of their used products and process them for zero waste, which has radically changed how they do things, and the very nature of the products many produce.

We all carry our own shopping bags. In 2020, humans used 750 billion plastic shopping bags, a million bags per minute, 150 bags per person on Earth, which, joined end-to-end, would circle the equator 4,500 times, which we used, on average, only 12 minutes before trashing them. They poisoned our lands and waters, us and other life. We used enough energy making them to drive cars 60 million miles, 250,000 trips from the Earth to the moon, every year. Most were never recycled. We cut down 15 billion trees a year to make paper bags. We no longer do that, with huge benefits.

The simple and easy change of eliminating wasted shopping bags has had huge positive benefits for health, environments and life-support systems, including reducing global warming. Similar results came from simple changes and reductions in product packaging. We store foods in glass and steel containers. We buy many more of our own foods in bulk in our own containers, or in standard containers available, accepted and reused by food sellers. We count these wastes and their harms in economic systems.

Progress has been made in addressing superfund and other hazardous waste sites. Laws that make producers of environmental harm responsible for eliminating those harms have greatly changed behaviors leading to new toxic waste site problems, and those laws have also bankrupted many companies and caused them to go out of business. The social good they produced was outweighed by the social harm they produced, so they were taken out of operation. Technological breakthroughs and concerted efforts have reduced these toxic waste horrors, but there is still much work to be done.

We have stopped producing inadequately tested chemicals, finding natural and sustainable alternatives.

Maintenance costs for roads, highways and bridges have been greatly reduced, because they are used so much less by vehicles, and many have been decommissioned. Central governments are much less able to manipulate state, regional and local governments, using highway funding carrots and sticks.