



## Zoocycle Background

Denver Zoo's mission is to secure a better world for animals through human understanding. Zoocycle is an exciting project that supports our overall mission and specifically our sustainability goals by eliminating 1.5 million pounds of trash from entering landfill, while fulfilling 20 percent of our energy needs. The design intent is to holistically improve our procurement, operational, waste and energy footprints. Being sustainable includes responsible consideration of multiple inputs from sourcing to waste reduction and production of energy. Zoocycle is housed in a purpose-build facility within Toyota Elephant Passage, which was constructed in 2011.

A considerable commitment was made to identify a technology that aligned with our sustainability targets. Investigations into current research and life cycle assessments were considered. A technology was needed to integrate into our goals of recycling while promoting reuse and energy recovery. Denver Zoo wanted a technology that significantly reduced contributions to landfilling and maintained the organization as responsible environmental stewards. The goal was to promote a sustainable culture that would foster a heightened awareness toward more sustainable practices from the organization, its guests, and the community. Gasification showed considerable promise to fulfill all of these goals.

First, this is a very safe system done at a micro scale. Denver Zoo has undergone a vigorous review and vetting process. The plan for operating the system meets all requirements outlined by the City and State Departments of Public Health and Environment and US EPA. The Engineering Design & Operations Plan (EDOP) can be located here: [www.denvergov.org/sirepub/agdocs.aspx?doctype=agenda&itemid=61414](http://www.denvergov.org/sirepub/agdocs.aspx?doctype=agenda&itemid=61414). The EDOP establishes the specific operational, environmental, and safety parameters of the facility.

Denver Zoo is using a 100-year-old proven technology called downdraft gasification. This is not a new technology. Rather, the new innovative piece the Zoo is implementing is the development of a consistent fuel from Zoo guest trash and Zoo animal waste. You see, most systems use a single source item, like wood chips, whereas we are sorting Zoo trash and Zoo animal waste to create a consistent fuel source, eliminating specific items like metal or toxic plastics from entering the system.

The new system will not change the look of the fence line, or Zoo footprint. The system will operate solely within the boundary of the Zoo and in the same location we currently manage our waste. The zoo will ensure this system does not interfere with the experience of our guests, the comfort of our animals, or our neighbors in City Park. The Zoocycle system's emission points will be controlled by air pollution control equipment and continuous monitoring systems. Furthermore, initial source testing and safety assessments will be performed by a State certified third-party.

Denver Zoo is extremely committed to sustainability. We are a Gold Leader under the State's Environmental Leadership Program and the Toyota Elephant Passage exhibit is Platinum Level LEED certified (making up 1/3 of the total buildings certified at this level in Colorado). We are the greenest zoo in the country and our efforts for the Zoocycle program meet the highest levels of environmental safety. Denver Zoo is now one of only four zoological institutions in the world, and the first in the western hemisphere, to achieve the highest international distinction for its environmental, health and safety management systems. In March 2015, Denver



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Zoo was reaccredited with ISO 14001 certification and, for the first time, awarded the OHSAS 18001 certification. Both prestigious certifications commit the Zoo to the utmost level of environmental, health and safety practices.

Denver Zoo is seeking a patent which focuses on the preparation of waste into fuel, and related technology specific to utilizing this new fuel source. Some aspects of how we are creating a consistent fuel-pellet out of Zoo trash and animal waste are not yet covered by our patent application, and therefore confidential. However, the EDOP does outline all the types of materials going in, which met all the stringent requirements from the City, State, and EPA. The Zoo went to great lengths to get citizen input in the planning process for Zoocycle which included 13 points of contact with stakeholders; as well as a presentation and public hearing for Denver Parks & Recreation Advisory Board which unanimously voted to recommend support for the project to the Director of Parks & Recreation. The Zoo received state approval and unanimous City Council approval in December 2014.