



DENVER
THE MILE HIGH CITY

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Summary Sheet – Background and Information for the Denver Zoo Waste to Energy Facility

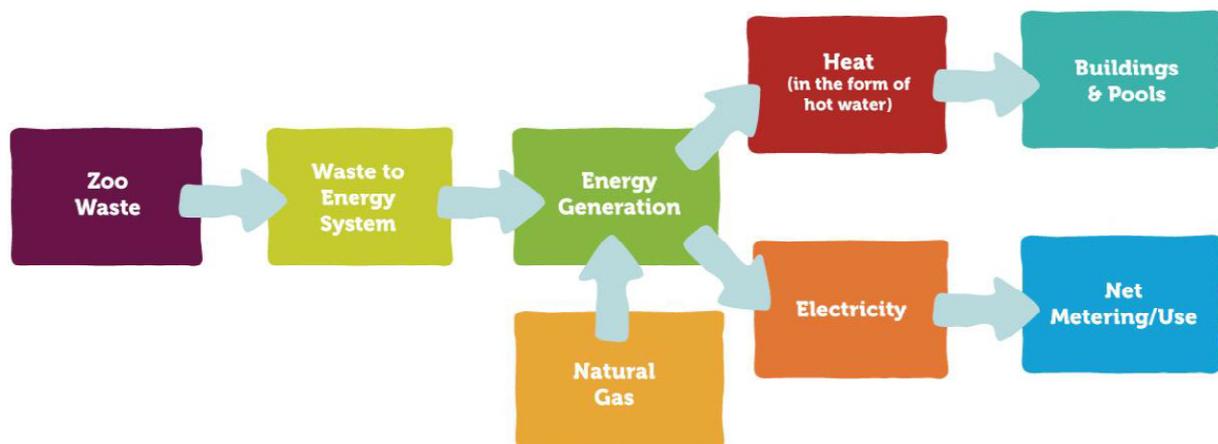
The Denver Zoo implements multiple efforts to minimize waste that would otherwise go to a landfill, including recycling and composting programs, and they are now planning a waste-to-energy facility, all of which are focused on the Zoo's objective to be a zero waste facility by 2025.

Since the planned waste-to-energy facility is viewed by the City and County of Denver (City) and the Colorado Department of Public Health and Environment (CDPHE) as a form of solid waste disposal, special reviews and approvals are needed, including issuing a Certificate of Designation, which for the City means passing an Ordinance.

The Zoo submitted a detailed Plan to the City and CDPHE that was revised per comments and then approved, as was the Certificate of Designation request.

Waste-to-Energy Facility Overview (from the Denver Zoo's PowerPoint presentation):

- Biomass gasification involves the thermo chemical conversion (high temperature, low oxygen process) of biomass, or in the zoo's case, zoo waste, into a combustible gas, called synthetic gas or syngas.
- Syngas contains hydrogen, carbon monoxide, methane, and other inert gases. This gas provides a fuel source to power a generator to produce electrical energy and heat.
- The process is required to meet stringent air emission standards and will be consistently monitored for compliance with the stipulations of their assigned State Air Permit.
- Ash is the single largest bi-product. Ash will be contained in an indoor enclosed pit, tested, and properly disposed. All attempts will be made to beneficially use this material in accordance with solid waste regulation.



Regulatory Agency Involvement:

- CDPHE reviewed the Zoo application for completeness, conducted a comprehensive technical review, and held a written public comment period via a public notice in the Denver Post.
- CDPHE concluded that “It is the determination of the Division that Denver Zoo’s proposed waste-to-energy facility can comply with technical, environmental, and public health standards of the Solid

Waste Regulations if the waste-to-energy facility is constructed, monitored, and operated as detailed in the Plan, and with the Conditions of the Division as stated in this letter.” Those conditions included maintaining financial assurance for closure and post-closure costs, and including CDPHE and City comments into the Plan.

- CDPHE has stated that they will be present for initial emissions testing of the system and will perform compliance visits to assess compliance with the assigned Air Permit on a routine basis (every 1-2 years).
- The Zoo must submit initial emissions data and annual compliance testing data to CDPHE as detailed in their assigned Air permit.

The City’s Involvement:

DEH –

- DEH solicited comments from the City’s Parks and Public Works departments, and the City Attorney’s Office. DEH also worked closely with CDPHE during this review process.
- DEH’s review focused on potential effects to onsite and surrounding human health and the environment. As such DEH worked to ensure that the appropriate environmental permits were obtained to regulate emissions, that the source of raw material would be limited and controlled, chemicals and waste-to-energy facility by-products would be properly stored and managed, associated potential sources of environmental concern were considered (spill containment), and that the facility would be sufficiently monitored.
- The Zoo responded to each of the City’s comments.
- Additionally, DEH and CDPHE will be notified of and will comment on potential future planned changes in operations.

City Council-

- According to the City’s Revised Municipal Code, Section 43-103, when considering whether to approve a certificate of designation, the Council shall take into account 1) the effects of the facility on nearby surroundings, 2) convenience of the facility to potential users, 3) the ability of the facility to comply with City and State environmental health regulations and rules, and 4) how the facility fits in with the City’s comprehensive plan. Additionally, 5) Council also needs to consider Environmental Health and State approvals.
- City Council heard comments during the Public Meeting portion of the First Reading and voted unanimously in favor of the Zoo’s waste-to-energy facility.

Key Points:

1. CDPHE and City procedures for review and approval were followed, including public comment periods.
2. The Denver Zoo conducted outreach efforts to inform the public of the proposed waste-to-energy facility.
3. Review of the Plan was a coordinated effort involving City departments and CDPHE.
4. The Zoo responded to and incorporated comments into their Plan.
5. Both DEH and CDPHE determined that the waste-to-energy facility if operated as stated in the Plan will be protective of human health and the environment.
6. The Denver Fire Department also provides review of Zoo submitted plans for fire protection and safety requirements.
7. The Plan and permits require facility monitoring to be in compliance. The Zoo must meet or be below all air emissions limitations assigned in the air permit by CDPHE.
8. As a result of the process, the air permit is more restrictive than originally anticipated by the Zoo.
9. The CD approved acceptance of limited City Parks & Recreation waste (wood material for the fuel blend). No other outside waste (off-Zoo property) currently approved.