

Geos Net Zero Energy Neighborhood

Arvada, Colorado, U.S.A.

Located less than 10-miles from downtown Denver, Geos Net Zero Energy Neighborhood is a planned mixed-use community that is a model of sustainable neighborhood planning. Its dense building layout is weaved into a framework of natural systems, stormwater-fed landscapes, and vibrant civic spaces that encourage environmentally conscious lifestyles among residents. The project will be built on 25.3-acres of underutilized industrial land in an area surrounded by older suburbs. The 282 residential units and 12,000-square feet of commercial retail space will be completely powered with renewable energy harvested from the earth and sun. When completed, GEOS will be the largest urban mixed-use neighborhood in the United States to operate using zero energy from fossil fuel-dependent sources like coal, oil, or natural gas.

To meet its energy goal of net-zero consumption, Geos must produce at least as much energy as it consumes. Accomplishing this not only means harvesting renewable energy from solar panels and geothermal wells, but also implementing site planning strategies that maximize energy efficiency. Street, lot, and block layouts are designed so that densely arranged buildings can be stretched east-to-west to allow for passive solar heating. This way, sunlight floods into south-facing windows during winter when the sun is low in the southern sky, yet remains blocked by the roof in summer when the sun is higher in the sky. East-west orientation also minimizes north-facing façade thereby reducing exposure to winter winds. This building arrangement reduces energy demand by one-third.

Well-designed landscape and tree plantings also accentuate energy efficiency. Deciduous tree species and placement are chosen to shade buildings from intense summer heat while still assuring year-round solar access to rooftop photovoltaic cells. Likewise, evergreen plantings serve an important purpose. Planting them

along property lines creates a barrier that protects buildings from harsh, winter wind, while also helping to unify the visual character of the neighborhood.

Adding to Geos mission of resource conservation, ecological stormwater management plays a major role in shaping the community. In Colorado's arid climate, rain water is a precious natural resource. Conventional developments typically collect runoff in large, unusable detention basins that are fenced off from the public realm. In contrast, Geos repurposes stormwater to enhance the public experience, distributing it throughout the site into street tree rain gardens, percolation parks, community gardens and private landscapes. These planted areas add beauty to the neighborhood as they frame public plazas, recreation areas, village greens, and town squares. This low impact strategy mimics predevelopment conditions and preserves the natural hydrology of the site, reducing erosion and flooding risks.

The goal of net-zero energy and ecological stormwater management is not simply to conserve resources but promote low-impact lifestyles and environmental stewardship within the community. The neighborhood integrates nature and agriculture into the fabric of everyday life, empowering residents to take active roles in managing their own resources and environment. Stormwater management, food production, and native habitat areas become intertwined with public pathways, parks, and civic spaces. Common greens are surrounded by fruit tree terraces that will be maintained and harvested by adjacent homeowners. Community gardens and composting areas are dispersed throughout the site, encouraging local food production and informal social interaction. A neighborhood path and trail system connects to Ralston Creek Regional Greenway, which provides safe and convenient access to schools, recreation centers, and other local

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destinations without relying on cars. Commuters have the option to utilize regional public bus service that conveniently connects to Denver's new commuter rail system called Fast Tracks. The design team's comprehensive approach to neighborhood planning sets a bold precedent for future suburban development.

Project Resources

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