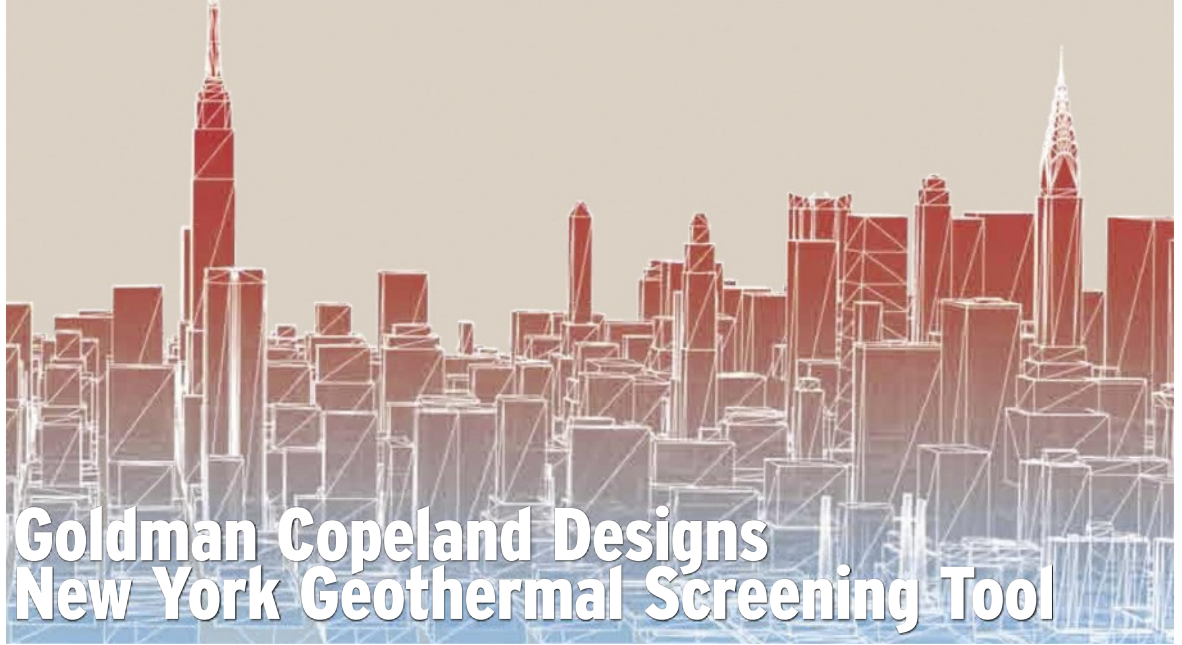




Charles Copeland



Goldman Copeland Designs New York Geothermal Screening Tool

New York's commitment to reduce its total greenhouse gas emissions by 80 percent by 2050 will require a dramatic rethinking of how the city's more than 850,000 structures will be heated and cooled.

One little-used option has been geothermal systems. Because they require a larger footprint than other systems, geothermal systems pose a challenge due to the city's intense density. Furthermore, the geological features of the area also can be problematic in large swathes of the city. Nevertheless, city leaders believe geothermal will be a necessary component in the long-term energy strategy.

In order to promote the use of geothermal systems, New York contracted with Goldman Copeland Consulting Engineers to produce a publicly available online geothermal screening tool that assesses the potential for using ground-source heat pumps for every building within the city.

"It is a big tool," says Charles Copeland, president and CEO of Goldman Copeland. "Not just because of the number of lots, but also the number of variables. For folks living on a farm in Michigan, installing a geothermal system is relatively easy. It is not the same in New York."

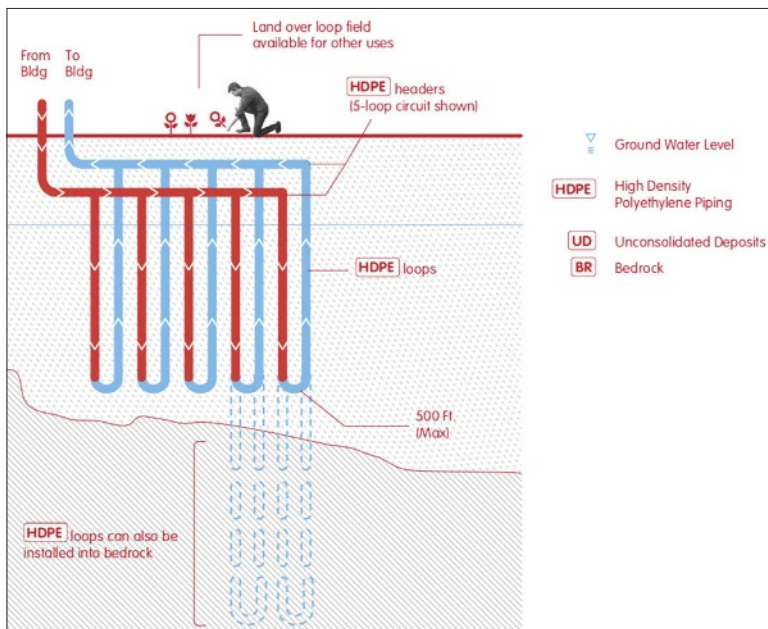
The tool analyzes the potential implementation of four types of geothermal systems (closed-loop, standing column well, open-loop, and hybrid systems) compared with a conventional HVAC system. It organizes every structure in the city into one of 25 types, based on age, size, and occupancy to establish a baseline for thermal load and conventional energy consumption. It also factors in land area availability for thermal storage/extraction and the geology at the Borough-Block-Lot level.

Overall, the tool shows limited geothermal potential in Manhattan and the Bronx because building loads often exceed the potential thermal capacity of the available outdoor space. Staten Island, Queens, and Brooklyn are more promising because there is more outdoor space for drilling, and building loads are generally less intense. However, Brooklyn has a large potable water aquifer, which also limits access to geothermal systems.

The majority of commercial buildings are not feasible because their large heating/cooling loads with limited outdoor space exceed the ground thermal capacity. The most feasible structures are smaller structures like schools, multifamily buildings, or single-family homes. In many cases, a hybrid system can be used, with a cooling tower and additional heating to offset peak loading.

"Building owners or others can find their building or lot on the web-based map and get a feasibility analysis based on the three different geothermal systems," Copeland says. He adds that because the tool uses generic installation costs, "final decisions should be made only after completing an in-depth feasibility study for the site."

Although the tool was designed for New York City, Copeland believes it can be adapted for other areas around the country using U.S. Geological Survey maps and local soil condition analysis.



SOURCE: NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION