



Bathing using hot spring fluid (Nicchu hot spa)

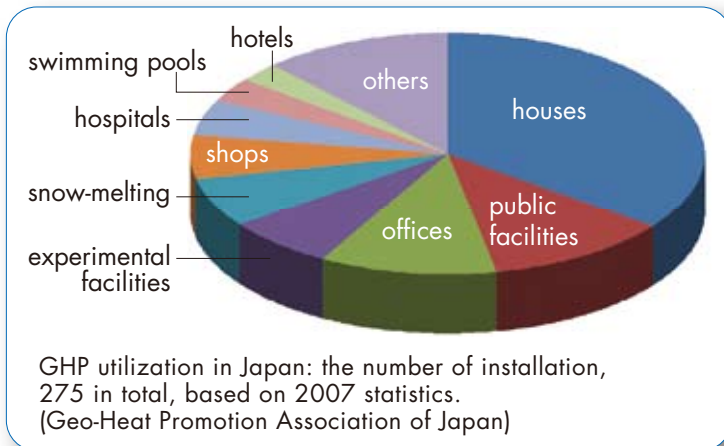
## Conventional direct use

In Japan, larger part of direct use of geothermal energy has been for bathing, and the rest for many other purposes including space heating, agriculture, snow melting, etc. At 2005, the total capacity of direct use was about 400 MWt and its used energy was 41.5 PJ.



GEOCOLOR (Hachimantai Geothermal Dyeing Inc.)

## Geothermal Heat Pump (GHP)



In Japan, GHP can be used for space heating and cooling in most parts of the country. It can also supply hot water to domestic systems, public spas and indoor swimming pools. Snow melting systems with GHP are used in northern districts. Although GHP market is still small in Japan, they are applied to a variety of buildings, such as public facilities (museum, schools, etc.), offices, hotels and individual houses.

A GHP system with borehole heat exchangers is common in Japan. Recently, **utilization of building foundation piles** as underground heat exchangers has been increasing for newly constructed buildings. **Retrofit to old buildings** is another challenge for promotion of GHP.

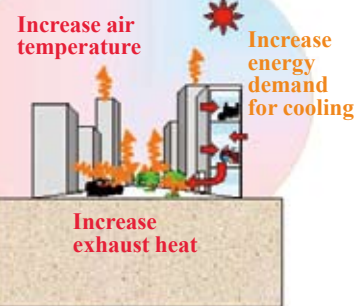


Retrofit of GHP system to an office building in central Tokyo: inserting U-tube (Sasada Building)

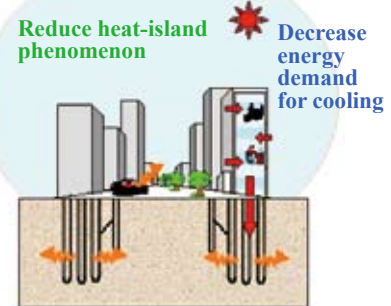
GHP does not emit any heat to outside atmosphere unlike conventional air-conditioners, thus it is quite effective for **reducing urban heat island (UHI) phenomenon** that is a serious problem especially in mega cities like Tokyo. An on-going national project evaluates the effectiveness of GHP for the mitigation of UHI. Adoption of GHP is a good practice for mega cities in other countries with a similar problem.

### Reduction of UHI by GHP

#### Current situation



#### Applying GHP



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