

Research Trends and Results

Using the energy of plant waste from cities

YAMAGISHI Yutaka, Senior Researcher
SONE Naoyuki, Researcher
KURIHARA Masao, Head
Landscape and Ecology Division, Road Department

(Key words) Biomass, plant waste, energy use, storage

1. Introduction

One low carbon city creation policy is the use of pruned branches and mowed grass etc. from green parks and roadside trees, etc. (below called, “plant waste from cities”) as sources of energy. However, while plant waste from cities has been chipped for use as fertilizer or materials as part of green recycling, it has rarely been used to supply energy. In response to these background circumstances, the Landscape and Ecology Division has been conducting “research on the use of local production for local consumption type reusable energy in cities” since FY2012. This report introduces the potentiality of the use of plant waste from cities as an energy source based on the results of these researches.

2. Plant waste from cities

According to “Concerning the Present State and Roadmap for Biomass Utilization Technology” in the “Biomass Commercialization Strategy” prepared in September 2012 by the Biomass Utilization Promotion Committee concerning the use of this energy, its practical use is possible now (2012) and in about 5 years (about 2017), and that source materials will include woody material and grassy plants.

Standards for the use of woody biomass as fuel include the Proposed Guideline to Fuel Use Chip Quality Standards of Iwate Prefecture, which is a local government that makes advanced use of woody biomass, Wooden Chip Quality Standards of the National Wood Chip Industry Federation, and the wood pellet quality standards enacted by the Japan Wood Pellet Association in harmony with the EN Standards for Non-industrial Use Wooden Pellets enacted jointly by 28 countries of Europe in 2010.

Comparing the characteristics of plant waste from cities as a fuel with these standards shows that immediately after pruning and mowing, the moisture content of the pruned branches and mowed grass is high. And measurements of the ash content of the leaves of the pruned trees and of the mowed grass show that it is higher than the standard levels, and that the contents of sulfur (*S*), nitrogen (*N*), and chlorine (*Cl*) are also higher than the standard values.

3. Future development and use of the results

Presumably pruned branches without leaves contain a lot of tree bark, but it is believed that it will be possible to use energy just like normal wood. So a study is being made of a process in which immediately after branches are pruned, their moisture content is lowered to prevent decay or fermentation, then they are stored and later used as energy.

And trial calculations of the quantity produced in two districts in Japan are being done, including, not only plant waste produced in cities by the maintenance of public works such as rivers, roads, parks, etc., but also other woody biomass such as construction waste, and surplus forest material. (See the figure).

And present technology studies concerning the possibility of using energy of small-scale parks etc. dispersed plant waste from cities, and including the results of the above study, will be summarized in the document, Technology Document Concerning Methods of Using Energy of Plant Waste from Cities that will be released as a TECHNICAL NOTE of NILIM.



Photo. Use of Branches Pruned from Park Trees to Heat Park Facilities
(Oi Pier Central Seashore Park: Tokyo)
(Left: Chip dryer using solar heat, right: boiler)

Figure Quantity of Usable Wooden Biomass around Showa Memorial Park (Trial Calculation)

