# Identification of the actual conditions of energy conservation designs in non-residential buildings

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## 1. Background and objective of study

Proper identification of the actual energy conservation performance of a building is necessary to examine energy conservation measures in the evaluation of energy conservation standards. Information concerning the evaluation results of energy conservation standards is based on the data of 18,000 buildings (non-residential buildings) every year and is playing important roles. Still, competent authorities are currently aggregating the data (by extracting values from paper documents) upon request from the Ministry of Land, Infrastructure and Transport. Too much of a workload is involved in this process. Also, since information collection is restricted to reduce the workload, detailed information cannot be obtained. Even though a great volume of data is available, the data are left without being used effectively. Therefore, the NILIM attempts to obtain fundamental information for revising energy conservation standards and propose research themes by entering information in the Energy Conservation Standards Conformity Judgment Program (web-based program),[1] encrypting calculation results, saving them on a server, and analyzing them.

## 2. Construction of a scheme to extract effective data

Data on a server contain data from the design phase, which are not the final version. Thus, effective data are extracted as follows.

1) Competent authorities enter "XML-ID" and "Re-output code" which are printed on submitted calculation results (the output file of the web program, printed and submitted as paper documents) in Excel files in a report to the Ministry of Land, Infrastructure, Transport and Tourism.

2) The NILIM receives the information from the Ministry of Land, Infrastructure, Transport and Tourism, searches data on the server ("XML-ID" is the identification name of data), and removes the encryption ("re-output code" is the cancellation password).

To reduce the workload 1), QR code for quick scanning of ID information is added. A check tool (Excel) to check for mistakes in entering information is also developed and distributed.

## 3. Trial gathering and analysis

As a trial, the ID numbers of about 6,000 buildings are obtained from some of the authorities. Figure 1 shows the relationship between floor area and the area of the exterior shell as an example of the analytical result. This information was analyzed and became necessary to construct the method to evaluate small-scale buildings that are now under examination. The identification of the area of the exterior walls and windows of individual buildings becomes necessary to perform this analysis. Thus, it was not possible to conduct detailed analysis using conventional investigation methods.
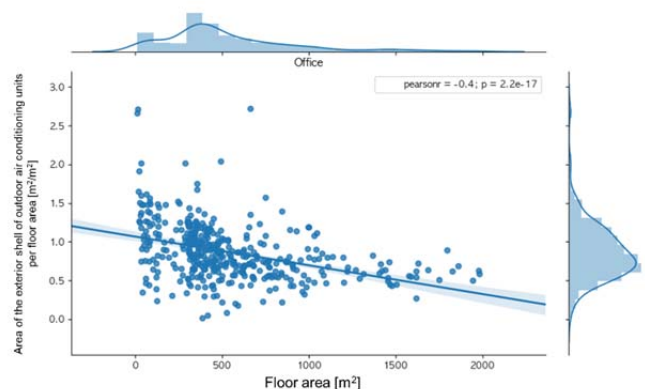


Figure 1 Relationship between floor area and the area of exterior shell (Kanto area, office buildings)

## 4. Summary and future perspectives

The scheme constructed in this study was found to reduce the workload of authorities and surely provide beneficial information concerning energy conservation designs. All data from FY 2018 can be obtained in the next fiscal year. Thus, the NILIM is going to analyze the actual conditions of energy conservation designs in Japan.

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☞For more information:

1) Technical information concerning energy consumption performances of buildings
https://www.kenken.go.jp/becc/index.html