# Development of method to evaluate energy conservation effects of the automatic control technology of construction facilities

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## 1. Evaluation of advanced energy conservation technologies

The NILIM is developing an energy consumption performance calculation program (for non-residential buildings)[1] that judges conformity to energy conservation standards. Yet, energy conservation technologies that can be evaluated with this program are clearly defined. It is limited to technologies where the energy conservation effects have already been demonstrated. In buildings aiming to become Zero Energy Buildings (ZEB), however, cutting edge and advanced technologies that cannot be evaluated with the current program are often used. In particular, automatic control technologies are expected to produce great energy conservation effects when they are customized based on weather conditions and operational conditions for specific buildings. Yet, it is difficult to generalize the effects and reflect them in the program. Thus, a new evaluation scheme using registered energy conservation evaluation organization is going to be established to enable the separate evaluation of the aforementioned advanced technologies.

## 2. Preparation of evaluation guideline

Based on consultations with the Ministry of Land, Infrastructure and Transport, the NILIM was set to prepare a guideline for the evaluation of automatic control technologies so that registered energy conservation evaluation organizations can produce fair evaluations. The guideline will stipulate the definition (8 scope) of target technologies, how evaluation results will be incorporated into the current energy consumption calculation method, points of evaluation, and other aspects. Figure 1 shows the voluntary evaluation guideline concerning automatic control technologies for air conditioning and conveyance devices (draft) prepared in this study
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## 3. Program expansion

The program was designed so that the input and calculation functions can be expanded to enter any evaluation results and to calculate the amount of primary energy consumption in design using the results. Figure 2 shows Format SP-1: Secondary pump current transformation volume input sheet. When evaluation results (the coefficient of the quartic formula in this
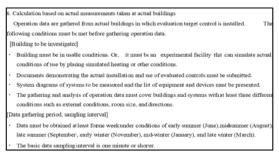


Figure 1 Guideline concerning air conditioning and conveyance control (draft)

example) are entered into this sheet, the program can conduct evaluations by adding the effect rate of the current transformation volume control of the secondary pump



Figure 2 Sheet for entering evaluation results (Format SP-1)

## 4. Use of the evaluation scheme

The use of this evaluation scheme has started mainly by the Housing Performance Evaluation and Display Association as voluntary evaluation concerning the energy consumption performance of buildings.[2] Only two evaluation guidelines have been released at this point. Yet, more evaluation guidelines will be gradually established by responding to the needs of private businesses.

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☞For more information:
1) Technical information concerning energy consumption performances of buildings
https://www.kenken.go.jp/becc/index.html
2) Housing Performance Evaluation and Display Association: Voluntary evaluation
https://www.hyoukakyoukai.or.jp/nini_hyoutei/index.html