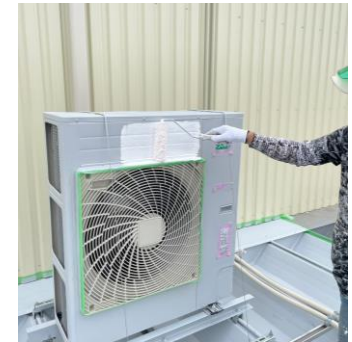




# 『 Air conditioning cost double energy saving plan 』 Proposal in Japan

① Thermal insulation coat for window glass  
Reduction of air conditioning load on indoor units  
25-30% per year, amortized within 5 years

② Rooftop outdoor unit and surrounding painting  
Reduction of the air conditioning load on the outdoor unit  
15% per annum - amortized within 3 years



# Relationship between 3 companies

## Nano Coating Manufacture



Sketch CO., Ltd.

Head office: 2-25-10 Asakusabashi, Taito-ku, Tokyo, Japan  
TEL: +3-5825-6503 FAX: +3-5825-6504  
CEO: Yasuhiro Shimada  
Director: Yoshihiro Takaseki  
Established: Feb, 1998  
Capital: 50 million JPY



<https://www.pro-support.shop/>



<https://www.sketch-english.com/>

## Nationwide Application management only in Japan



ECO SHOP Co., Ltd.

Head office: 2-25-10 Asakusabashi, Taito-ku, Tokyo, Japan  
TEL: +3-5820-1665 FAX: +3-5825-6504  
CEO: Yasuhiro Shimada  
Director: Yoshihiro Takaseki  
Established: Sep, 2008  
Capital: 6 million JPY  
URL: <https://ecoshop-sdgs.glass-business.com/>



## Dissemination activities (Sales Promotion) in Japan



Head office: 2-25-10 Asakusabashi, Taito-ku, Tokyo, Japan  
TEL: +3-5809-1366 FAX: +3-5825-6504  
Representative director: Yasuhiro Shimada  
Secretary director: Yoshihiro Takaseki  
Established: Feb, 2019  
URL: <https://www.syouene-sdgs.net/>



# No.1 market share in the window glass coating industry,

Sales to more than 30 countries overseas.  
Over 1 million sqms of application results



Cost-effectiveness is very high for application cost of Heat cut counter-measurement of window glass.

- ① With a near-infrared cut rate exceeding 90%, it is the industry's most affordable at 10,000 yen per sqm in Japan.
- ② Window film lasts twice as long with a durability of 15 years.
- ③ Comes with a 10-year reinstallation guarantee, film not included.
- ④ Depreciation within 5 years, followed by a positive value for the remaining 10 years (theoretical value).
- ⑤ It is also possible to restore the original condition using a dedicated adhesive remover, making it ideal for tenants.
- ⑥ A track record of over 15 years.

From 2020 to 2023, we have a wide range of nationwide application achievements. This includes the ongoing application in 1,100 Daiso stores across the country and the ongoing application of 55 new stores for Drugstore.



In addition, we have a multitude of achievements in various sectors including government offices, schools, hospitals, hotels, golf courses, and more.





# What is IRUV Cut Coat H-SC?



# “IRUV Cut Coat H-SC” is a heat-blocking and insulation coating agent

“IRUV Cut Coat H-SC” is a nano-coating agent that is applied to existing building windows using a roller



Application Cost  
10,000yen per sqm  
(More than 10sqms)

- Heat-blocking effect: Increases near-infrared cut rate by approximately 90% or more.
    - ➔ Near-infrared cut of 90% or more is achieved, as shown in the sketch only.
    - ➔ Reduces direct solar heat during summer by approximately 8°C to 15°C.
  - Improved to block 99% of ultraviolet rays.
    - ➔ Prevent fading of merchandise, tatami mats, and flooring.
    - ➔ Acts as a deterrent against flying insects with compound eyes.
  - Over 50% reduction in condensation.
    - ➔ Delays the occurrence of condensation and minimizes water dripping.
  - 15-year weather resistance with a 10-year reinstallation guarantee.
    - ➔ Offers durability that is twice as long as regular window films.
  - Reduces air conditioning load, resulting in energy savings of 25-30%.\*
    - ➔ Depreciation within 5 years (theoretical value).
- \*Note: The energy savings percentage may vary depending on specific conditions and factors.

※環境省実証認証事業ETVの試験結果より

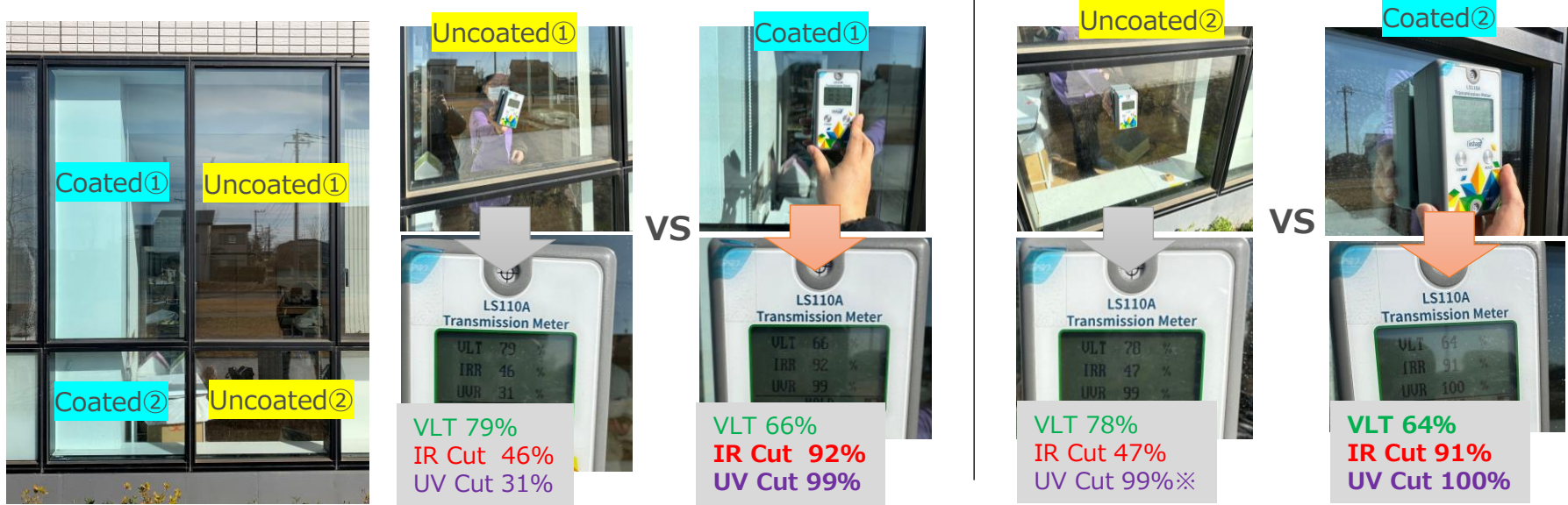
<https://www.env.go.jp/policy/etv/pdf/list/h25/051-1313a.pdf>

# Report on Verification of Window Glass Heat-blocking and UV Coating Effect on Exterior Window Glass Surfaces

Verification Date and Time: Thursday, January 26, 2023, from 11:00 AM to 11:30 AM.

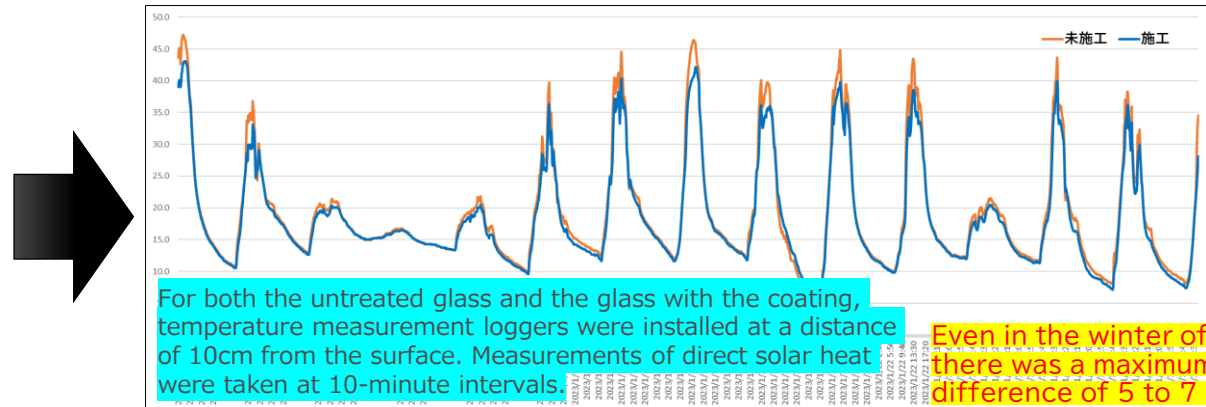
## Verification 1: Performance Confirmation using Optical Characterization Equipment

**IR Cut 46~47% → 91~92%**    **UV Cut 31% → 99%<sup>^</sup>**



Note: The window glass surface for Verification 2 was not coated with the window glass heat-blocking and UV coating. Instead, it had a window film applied on the interior side, which indicates a UV cut rate of 99%.

## Verification 2: Temperature Measurement using Data Loggers



For both the untreated glass and the glass with the coating, temperature measurement loggers were installed at a distance of 10cm from the surface. Measurements of direct solar heat were taken at 10-minute intervals.

Even in the winter of January 2023, there was a maximum temperature difference of 5 to 7 degrees.

# an example of an energy-saving simulation:

## Restaurant area at Golf Course

神奈川カントリークラブ		2021年5月～2022年4月分													
窓ガラスの遮熱・断熱・UVカットコーティング 省エネ率10%の場合の償却シミュレーション												2021年5月～2022年4月分のデータに基づく			
	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月			
ガス料金	227,707円	214,289円	391,592円	340,398円	196,019円	177,150円	173,232円	234,351円	256,859円	186,903円	170,200円	160,506円			
削減金額	22,771円	21,429円	39,159円	34,040円	19,602円	17,715円	17,323円	23,435円	25,686円	18,690円	17,020円	16,051円			
In the case of a 10% energy savings rate				導入費用				年間削減金額				Amortization period			
				1,988,000円				272,921円				7.3years			
窓ガラスの遮熱・断熱・UVカットコーティング 省エネ率15%の場合の償却シミュレーション												2021年5月～2022年4月分のデータに基づく			
	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月			
ガス料金	227,707円	214,289円	391,592円	340,398円	196,019円	177,150円	173,232円	234,351円	256,859円	186,903円	170,200円	160,506円			
削減金額	34,156円	32,143円	58,739円	51,060円	29,403円	26,573円	25,985円	35,153円	38,529円	28,035円	25,530円	24,076円			
In the case of a 15% energy savings rate				導入費用				年間削減金額				Amortization period			
				1,988,000円				409,381円				4.9years			
窓ガラスの遮熱・断熱・UVカットコーティング 省エネ率20%の場合の償却シミュレーション												2021年5月～2022年4月分のデータに基づく			
	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月			
ガス料金	227,707円	214,289円	391,592円	340,398円	196,019円	177,150円	173,232円	234,351円	256,859円	186,903円	170,200円	160,506円			
削減金額	45,541円	42,858円	78,318円	68,080円	39,204円	35,430円	34,646円	46,870円	51,372円	37,381円	34,040円	32,101円			
In the case of a 20% energy savings rate				導入費用				年間削減金額				Amortization period			
				1,988,000円				545,841円				3.6 years			

# Additional Strong Points (Appeal Points):

- No.1 Domestic Market Share (over 80%) and No.1 Global Sales Performance (in over 30 countries).
- Over 15 years of application experience.
- Nationwide application network System in Japan
- Possibility of installation in tenant stores with the ability to restore the original condition using remover liquid.
- Support provided from internal meetings, presentation, test installations, performance evaluations, temperature measurements, to energy-saving calculations.
- In case of competition with other coating agents, we can conduct side-by-side application and perform finishing and performance evaluation verifications.
- Less prone to thermal cracking compared to window films (with a thickness difference of  $50\mu\text{m}$  for films and  $8\mu\text{m}$  for glass coating).
- More cost-effective with lower installation costs compared to heat-blocking films (priced at 15,000 to 20,000 yen per square meter) of the same performance level, with double the durability.

## Demerit(weak point)

- For reducing air conditioning load, we can provide reference values but cannot guarantee specific energy-saving rates (the same applies to films).
- Our coating does not have features such as shatter resistance or security film functionality, similar to window films.
- We do not recommend applying the coating to wire mesh glass as it may increase the risk of thermal cracking (the same applies to films).
- After installation, some dust may adhere to the surface to some extent. We consider it acceptable as long as it doesn't cause significant discomfort from a distance of 1 meter or more.
- During the coating process, there may be a solvent odor. If window opening is not possible, the odor may persist until the next day.
- Maintenance should be done using neutral detergent or water only. Glass cleaners containing alkaline components are not suitable for use.
- External applications or coating over films are not covered by the 10-year reinstallation guarantee.



# The reason why we are No. 1 in the window glass coating industry

- We are the only company in the window glass coating industry that uses a roller application method. The fact that anyone can coat with almost no mistakes or uneven coating is the reason why we have a nationwide responsible application system.

In addition, the reason why it can be sold, including overseas, is that it is easier to install than other companies' glass coats.

- Because of the risk of failure and high material costs for other companies' glass coats, the installation price may be more than 20,000 yen per square meter. .

- In roller construction, the window size is measured for each sheet and applied between 25g and 30g per square meter,

All window glass have the same film thickness, and can exhibit the same performance, enabling quality control.

- Companies' glass coats advertise high performance in pamphlets, etc., but the performance of the actual coated window glass is low and there are many falsehoods. Also, because it is difficult to apply, there are many uneven coatings and drips.

- The performance of the thermal barrier nanomaterial (CTO) used in the nano-coating agent for window glass coating is high, and we are the only company that can demonstrate a near-infrared cut rate of 90% by applying it with a roller at 25g to 30g per square meter.

- We are the only company that allows you to evaluate the infrared cut rate, UV cut rate, and visible light transmittance together with the customer after installation using an optical property measuring instrument.

# Why Companies Adopt IRUV Cut Coat H-SC?

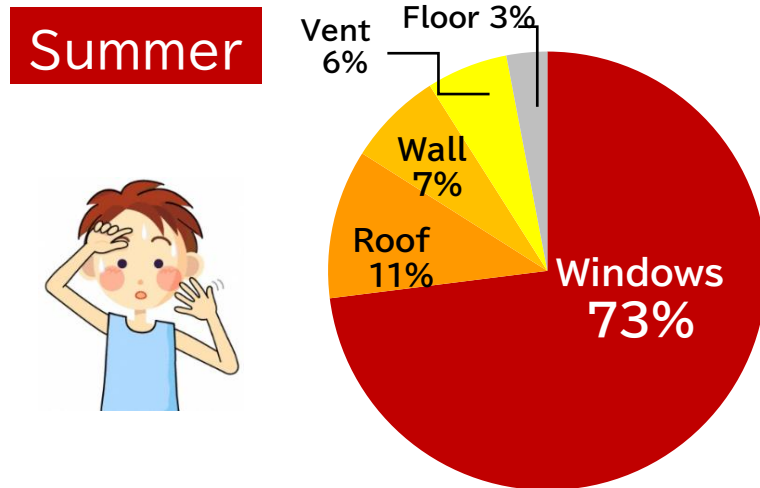
- Already used film or other company's glass coat, and our product is cheaper and has better performance.
- There is already a problem such as the window glass surface is hot or cold, and there is a case that we want to solve.
- Even after exhausting energy-saving measures, we are still looking for energy-saving products.
- It would like to budget and complete the application by the end of the term.
- It wants to solve the problem of soaring electricity bills, even if only a little.
- It wants to appeal to CO2 reduction of SDGs.
- Evidence of performance is objective and easy to understand, from demonstration construction to effect measurement and energy-saving simulation.
- You can feel the high performance by feeling the temperature.
- Durability 15 years and double the durability of window film is attractive.
- 5 years amortization and 10 years remaining is attractive as a reference value.

## The window glass with the most heat transfer

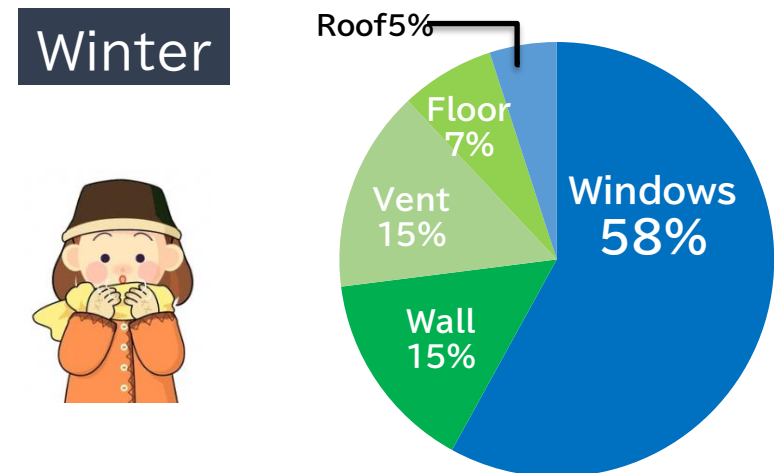
It is not an exaggeration to say that summer heat and coldness in winter depend on the window. The influence of exterior walls and roofs that are in contact with the outside air is surprisingly small, and most of the heat comes in and out of the windows.

73% of the solar heat comes into the room from the window in the summer, and 58% of the heating heat escapes from the window in the winter, assuming the whole building as 100%. In other words, in building of energy saving measures, heat shielding against window glass is the most effective.

●The rate at which heat enters during cooling



●The rate at which heat escapes from the window during heating



# Reference material: Importance of thermal insulation measures for window glass

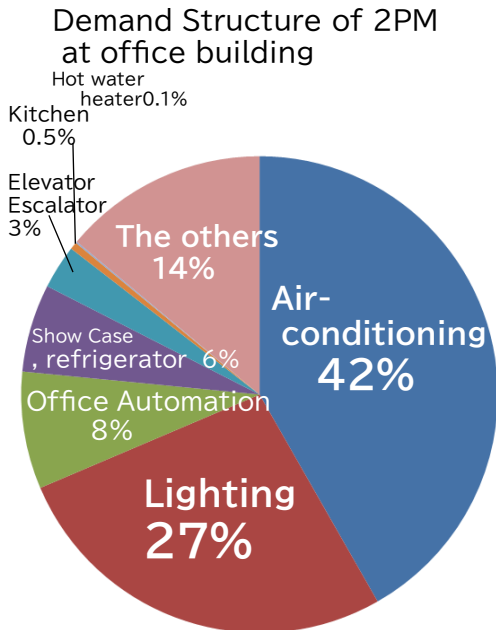
## The biggest point is to reduce the work of air conditioning

"Air conditioning cost reduction measures" from 10 am to 4pm in the daytime is top priority

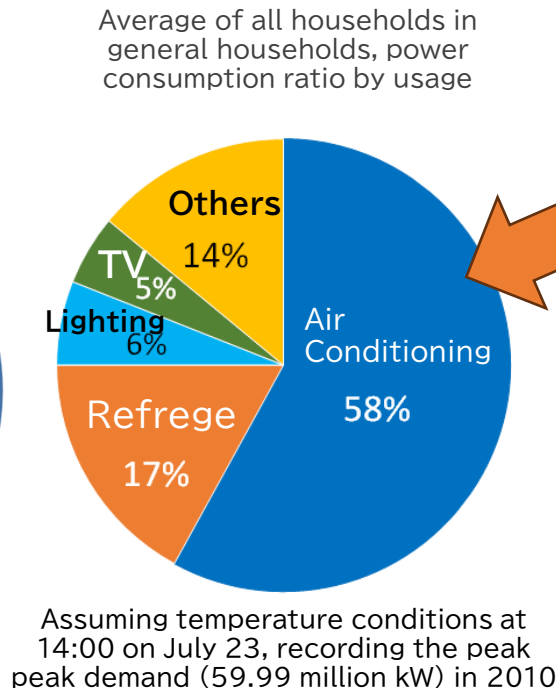
It is well-known that the proportion of air-conditioning equipment occupied in power consumption is large. How to efficiently use air conditioning equipment that accounts for this large proportion will be the most important point of energy conservation.

So, where and how can we improve it? For that, we must pay attention to windows where heat come in and out the most.

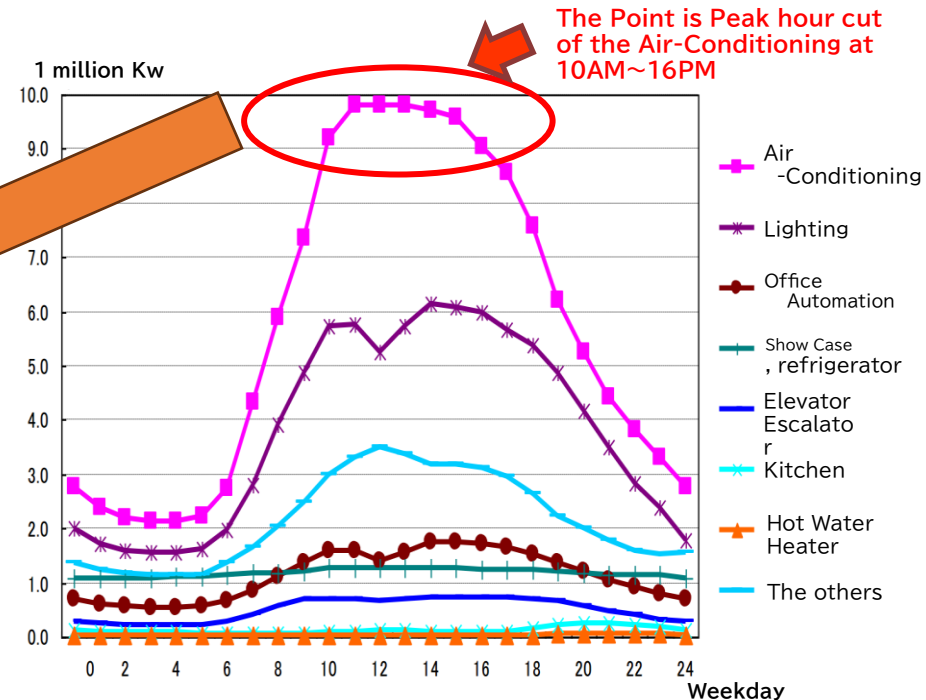
### In the case of office building



### In the case of house



### Demand for electric power at hourly intervals



The Information From Agency for Japanese Natural Resources and Energy on May, 2011

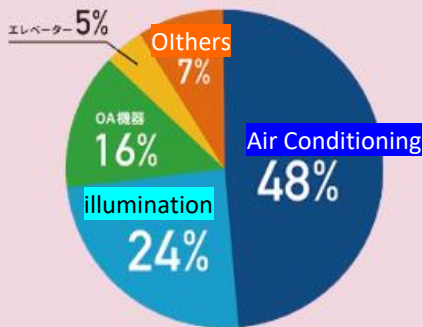
# Reference materials Breakdown of electricity consumption in each industry

## 年間電気代削減（省エネ）率

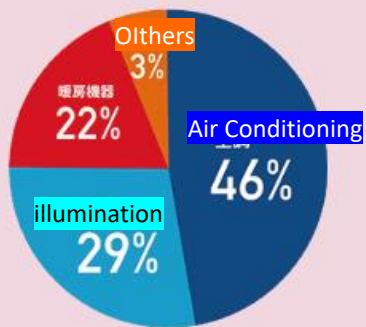
Annual electricity bill reduction rate

## 各業界別電気代の内訳

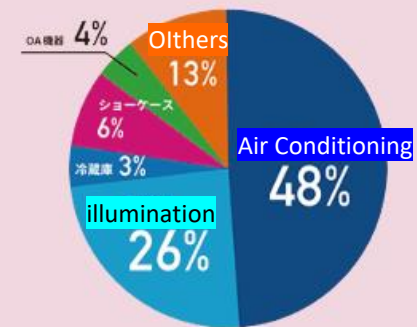
Office building



Restaurant



Retail store

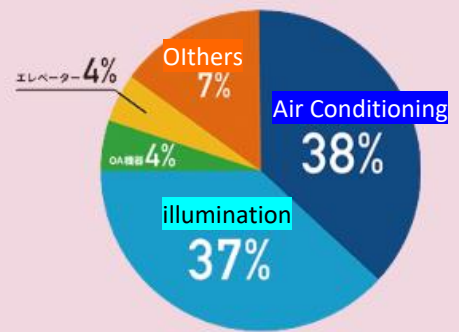


Air conditioning ratio 48% x energy saving rate 25% = 12% energy saving of electricity bill

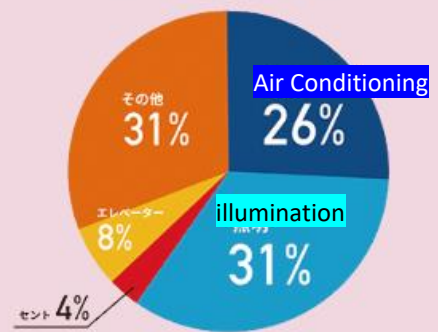
11.5% Reduction

12% Reduction

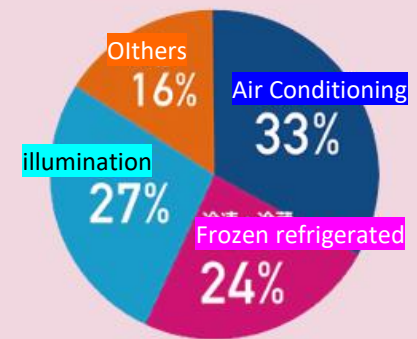
ホテル旅館



Hospital



ドラッグストア



9.5% Reduction

6.5% Reduction

8.25% Reduction

自社の年間電気代に上記%をかけた金額が業界平均の省エネ額になります。

## Method of low carbon society

From the entry into force of the Kyoto Protocol to the present, various energy-saving technologies have been developed, commercialized and put into practical use in the construction and construction fields. Among them, it has been clarified that window glass measures are the most advantageous in terms of the relationship between the introduction cost and the CO2 reduction effect.

The Comparison report for the amount of CO2 reduction to be the energy-saving measures of the building in case of budget of ¥100 millions.

Method	Cost ¥100billion	The CO2 Reduction effect [ t -CO2]	The CO2 reduction effect per ¥100million [t-CO2/100million]
High Thermal material	5920	-22771	-3.85
High Reflective Paint	3222	7007	2.17
<b>Heat Insulation Film</b>	2477	117270	47.35
Gardening Rooftop	7900	3756	0.48
Earth thermal heat pump	10764	46208	4.29
Ground tree planting	6100	10124	1.66
Water-retentive pavement	5424	7791	1.44

平成 21 年度地方公共団体実行計画（区域施策）  
策定マニュアルに関する都市・街区単位  
における低炭素化手法の検討業務

(Report)  
報告書

March. 2010

平成 22 年 3 月

MRI 株式会社 三菱総合研究所

(Mitsubishi Research Institute, Inc.)



Glass Film

VS



Glass Coating



Energy-saving plan for air conditioning costs of 15% or more.  
Rust prevention, heat insulation, antifouling shield

## THERMAL PAINT for outdoor unit

Waterproof auxiliary & rust-proof coating for outdoor unit and its surroundings

「Rust Shield」

+

Thermal Paint for outdoor unit and its surroundings

「Thermo ECO Shield」

+

Antifouling and maintaining reflectance for outdoor unit and its surroundings

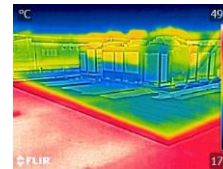
「Super Glass Barrier」



Before



After



Uncoated & Coated



Uncoated



Coated

Uncoated

# Outdoor unit painting: One-of-a-kind construction method, many installation results

## Application results one after another

Tokyo Nishitokushukai Hospital 538.88㎡ on Aug 2022  
 Saitama Sekshinkai Hospital 1586㎡ on October 2022  
 Drugstore Mori 127 stores during February to May 2023



Drug Store Mori    Tokyo Nishi tokushukai Hospital    Saitama Hospital

Annual energy saving about 15%  
 Amortization of application cost within 2-3 years,  
 remaining 7-8 years plus

2021年度 施工前				2022年度 施工後			
日付	電気使用量Kw	平均温度℃	日照時間h	日付	電気使用量Kw	平均温度℃	日照時間h
8月26日	16728.43	30.5	7.7	8月27日	15446.21	29	5.5
8月27日	16897.13	30	8.5	9月1日	15594.7	27.1	9.8
8月28日	16019.29	29.8	8	9月2日	15078.58	23.2	10.7
8月30日	16006.52	29.2	9.8	9月3日	14377.4	24.6	5.8
8月30日	16006.52	29.2	9.8	9月8日	14777.96	23.5	10.3
9月10日	14110.08	24.8	8.5	9月9日	15451.22	24.5	11.8
9月13日	12902.78	25.2	8.3	9月10日	15080.26	25.3	12.2
9月15日	15323.31	22.9	6.2	9月11日	13060.65	24.4	9.3
平均値	15499.26	27.70	8.35	平均値	14858.37	25.20	9.43

Daily average electricity consumption difference (before and after) 640.89Kw  
 Average daily reduction rate (comparison before and after) 4.14% reduction  
 Daily average reduction rate when air conditioning ratio is 34.7%: 11.9%

## Only our company is multi-functional with 3 products and 4 coats

- ① Rust Shield = Anti-corrosion/waterproof assistance  
 \* Super high grade epoxy resin that is not normally used in general painting
- ②③ Thermo ECO Shield = white, thermal insulation  
 \*Hollow beads are twice as many as other companies
- ④ Super Glass Barrier=Anti-Dust Nano Coating with  
 = antistatic, super-hydrophilic self-cleaning function.  
 \*Sales performance of 10 million square meters worldwide  
 \*Applied products for solar panels are patented

## Rooftop: 30°C outside, 20°C inside difference.

Coating on a folded plate roof



32.5°C Down



Indoor ceiling temperature without coating



20.5°C Down





# 3 steps of coating for Thermal paint

## First coat 「Rust Shield」

### 1 Anti-Rust

: Long-term anti-rust effect with special epoxy resin

### 2 Auxiliary waterproof

: The special epoxy resin plays an auxiliary role in preventing rain and water leaks.

+

## Second and Third coat 「Thermo ECO Shield」

### 3 High reflection

: Shields direct solar heat with a high reflectance of 85% or more  
= Significant reduction in air conditioning costs in summer!

### 4 Heat insulation

: Uses 12% of special hollow silica beads, the highest in the industry. Significantly improved heat insulation in summer and winter

### 5 Sound insulation

: Suppresses the noise of the outdoor unit and reduces leaks.

+

## Topcoat 「Super Glass Barrier」

### 6 Antistatic and antifouling performance

: Mainly reduces adhesion of inorganic dirt such as yellow sand and volcanic ash.

### 7 Super hydrophilic antifouling performance

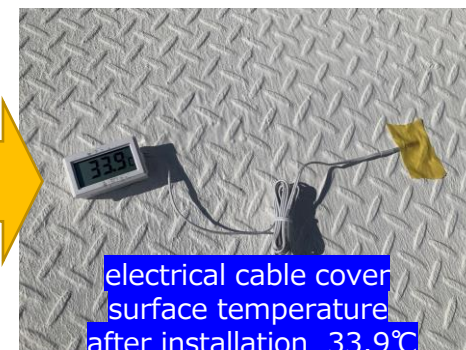
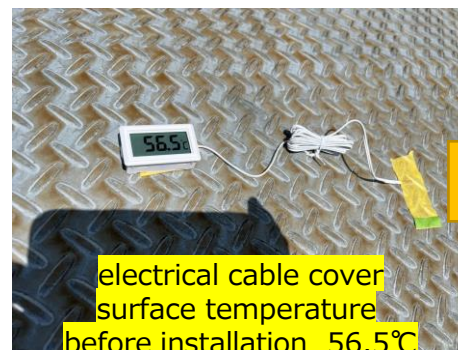
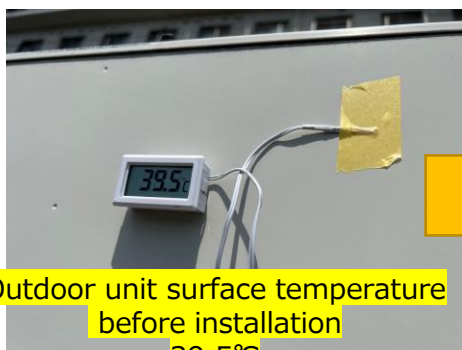
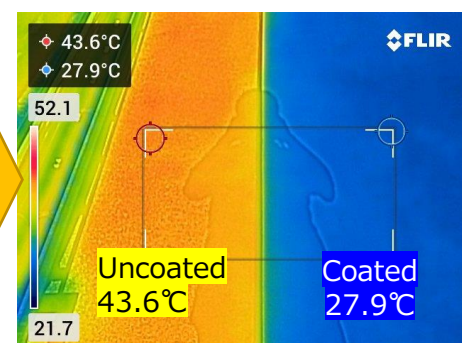
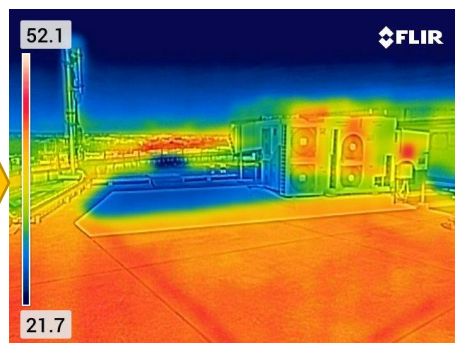
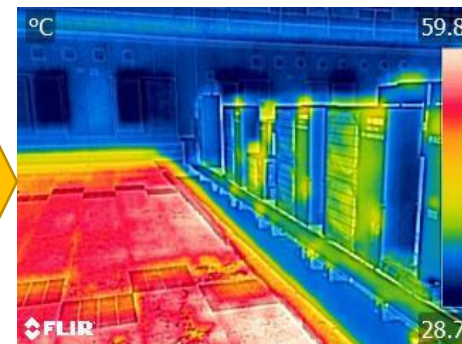
: It rinses away dirt with rain or running water.

### 8 Maintain infrared reflectance

: Excellent antifouling performance continues to maintain high reflectance. 10% to 15% reduction in infrared reflectance without coating.

**7,700 yen per sqm with all functions from ① to ⑧ in Japan**

# Temperature comparison after application



Outdoor unit surface temperature before installation 39.5°C

Outdoor unit surface temperature after installation 32.8°C

electrical cable cover surface temperature before installation 56.5°C

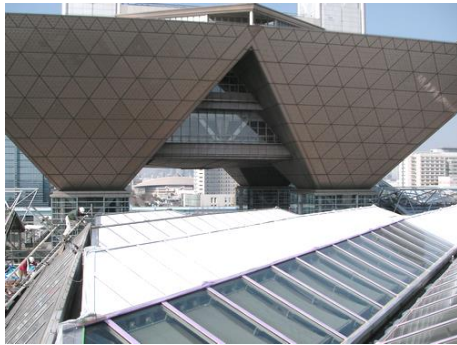
electrical cable cover surface temperature after installation 33.9°C

# Case Study: Tokyo Big Sight West Hall Roof light Area.

## Received Contract for Application of Anti-fouling Coating with Heat-reflective Paint.

Objective: Applying heat-reflective paint to glass surfaces for light-blocking and heat-insulating purposes.

Result: After conducting a test application with another company's heat-reflective paint, our painted surfaces maintained their white color even after 2 months, proving the sustained heat-insulating effect due to the maintenance of infrared reflectance. As a result, our company was chosen, and **we carried out a 2000m<sup>2</sup> application.**

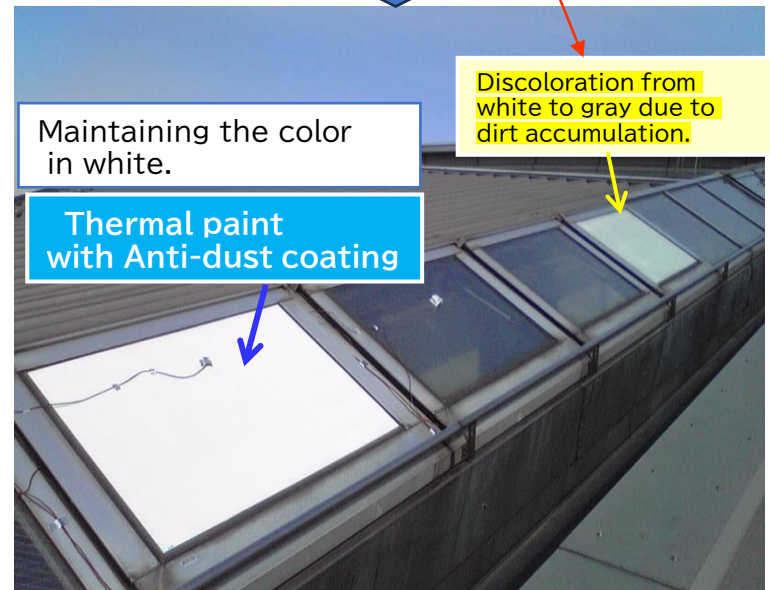


We received an order for a 2000m<sup>2</sup> application.

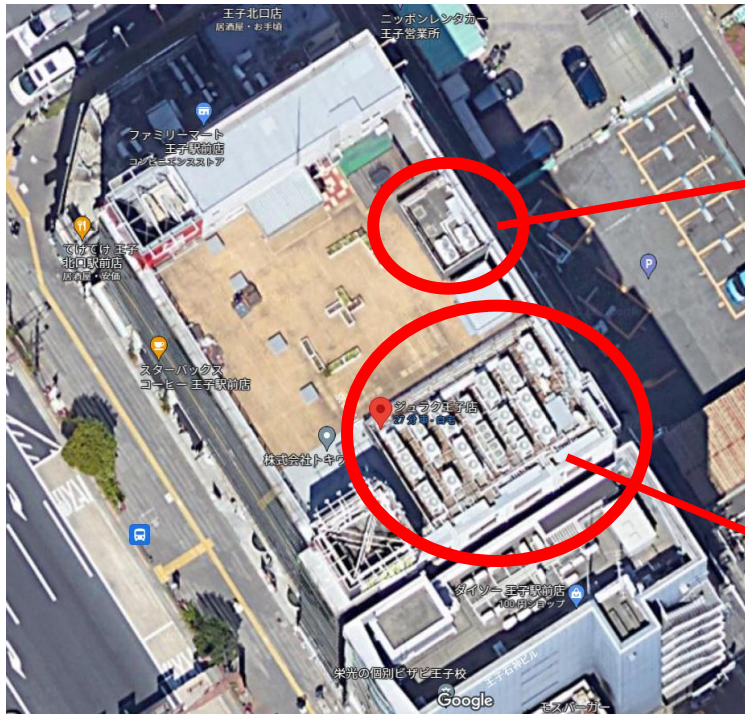
Thermal paint of other companies + Anti-dust nano coat Super Glass Barrier



2 months later



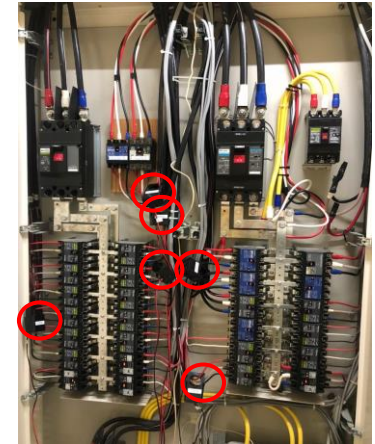
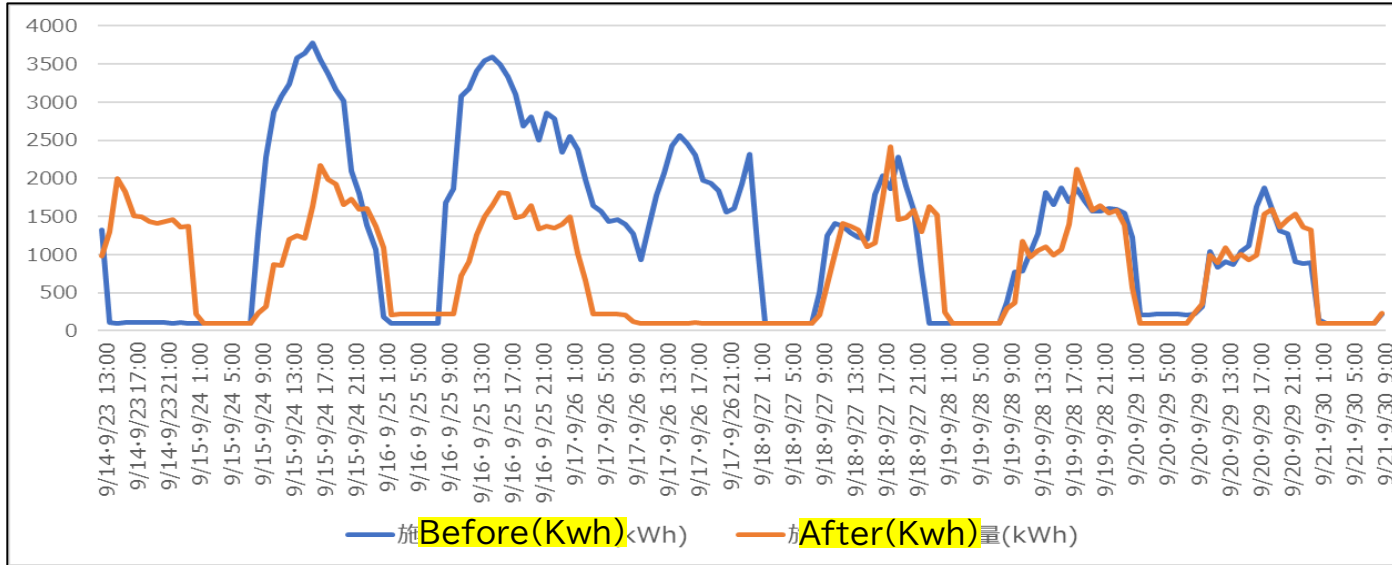
# A certain office building in Tokyo, Thermo ECO Shield Coating 285 m<sup>2</sup> Application completed in 3 days in August 2022



electric bill	2021								2022			
Electricity usage	May	June	July	August	September	October	November	December	January	February	March	April
	¥1,800,000	¥1,855,000	¥1,973,000	¥2,420,000	¥2,290,000	¥1,975,000	¥1,690,000	¥1,530,000	¥1,655,000	¥1,910,000	¥1,790,000	¥2,110,000
Air conditioning cost ratio 40%	¥720,000	¥742,000	¥789,200	¥968,000	¥916,000	¥790,000	¥676,000	¥612,000	¥662,000	¥764,000	¥716,000	¥844,000
Energy saving ratio 10%	¥72,000	¥74,200	¥78,920	¥96,800	¥91,600	¥79,000	¥67,600	¥61,200	¥66,200	¥76,400	¥71,600	¥84,400
Application Cost	¥3,320,000	*As a precondition, 40% of the electricity consumption is assumed to be air conditioning cost, and it is assumed that 10% energy saving is achieved by painting the outdoor unit. In the energy-saving simulation, it is depreciated in 3.61 years, and the remaining 6.39 years is profit because the durability of the paint is 10 years.										
Amortization (year)	3.61											
The remaining 6.39 years are profit.												

# Case Study: Logger Verification for a Drugstore Retail Store

- Logger Measurement Period: September 9th, 2022, 1:00 AM - September 30th, 2022, 12:00 PM
- Pre-installation Measurement Period: September 9th, 2022, 1:00 AM - September 21st, 2022, 9:00 AM
- Installation Period: September 21st, 2022, 9:00 AM - September 23rd, 2022, 12:00 PM
- Post-installation Measurement Period: September 23rd, 2022, 1:00 PM - September 30th, 2022, 10:00 AM



	Date	Cumulative Power Consumption (Wh)					
		CH1(AC4)	CH2(AC7)	CH3(Ref)	CH4(Freezer)	CH5(Freezer)	CH6(Ref)
<b>B</b>	2022/9/9~	38,102	33,125	83,182	154,500	92,213	165,405
	2022/9/20	19,411	2,992	63,601	134,689	73,527	113,227
<b>A</b>	2022/9/24~	22,504	2,919	63,910	136,749	76,191	119,719
	2022/9/30	1,204	1,156	17,420	46,612	26,474	28,663
<b>R e s u l t</b>	Before Ave	30444.83	16498.67	75440.17	148076.67	88267.50	152180.00
	After Ave	25846.30	13579.50	59722.71	124719.14	69470.57	109164.57
	Reduction Rate	15.10%	17.69%	20.83%	15.77%	21.30%	28.27%

## Additional Strong Points (Appeal Points), Supplementary information

- By protecting the frame, it prevents high pressure cuts and improves the durability of the outdoor unit.
- High hollow bead solid content ratio for maximum performance. The finish becomes uneven and is covered with an antifouling coat. Other companies have no choice but to reduce the solids content in repainting the exterior of houses, etc., because they emphasize aesthetics.
- The thermal insulation paint industry is reluctant to reduce the area, only making proposals for general exterior materials, roofs, and walls.
- Only our company and one other company are proposing energy-saving with outdoor unit painting, and almost no one in Japan is doing it.
- We are preparing a nationwide responsible construction system. (West Japan area is almost completed)
- Anti-static super-hydrophilic antifouling coating is the only product of our company in the world. 10 years weather resistant.
- With a logger, it is possible to pre-verify and report the amount of electricity used before and after application and non-application for each outdoor unit.
- It is also effective for painting power conditioners and main power supply equipment of mega solar plants.

## Demerit (weak point)

- For the reduction of the air conditioning load, the guaranteed value of the energy saving rate cannot be obtained, and only the reference value is provided.
- Because it is an energy-saving painting, not a repainting that maintains beauty, the painted surface will be uneven after application.
- Only outdoor units installed on the roof are subject to construction.  
Not applicable for installation on the floor or inside a building.
- Depreciation is quick, but construction costs tend to be high. Example)  $500\text{m}^2 \times 7700 \text{ yen} = 3.85 \text{ million yen}$
- Because the logger verification takes 2 weeks to 1 month before and after construction, it may take time to adopt.
- Rust Shield is a strong solvent, so a different base coat is used because it is not compatible with water-based paint films. ▪ If the outdoor unit is to be replaced within 2-3 years, it is better to install it after the replacement.

# Reasons why companies adopt outdoor unit painting

- We have problems with outdoor unit failure, rust, and high pressure cut.
- Even after exhausting energy-saving measures, we are still looking for energy-saving products.
- We would like to budget and complete the construction by the end of the term.
- I want to solve the problem of soaring electricity bills, even if only a little.
- I want to appeal to CO2 reduction of SDGs.
- Evidence of performance is objective and easy to understand, from demonstration construction to effect measurement and energy-saving simulation.
- After application, you can feel it clearly when you touch the floor surface of the unapplied area.
- It is also attractive as a reference value that the remaining 7 years will be plus in 3 years of amortization.
- Attractive as a measure to extend the life of outdoor units
- Painting the outdoor unit does not constitute modification and is not exempt from warranty.
- It is reassuring to be able to receive a uniform price with a nationwide construction system.

## Kansai Electric Power

Kansai Electric Power Co., Inc. Kyoto Branch  
Engineering Group Leader Masanobu Nishimura

### Verification equipment

- Rooftop outdoor unit (2 units)
- Cooling capacity (22.4KW/unit)
- Power consumption (6.1kW)
- Set room temperature (29°C)

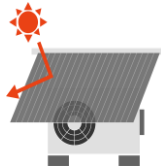
### Measuring method

Measure the power and current of the outdoor unit, as well as the intake air temperature of the unit, the current of the outdoor unit, and the temperatures in the rooftop and ceiling space at one-minute intervals.

Additionally, use infrared thermography to measure the temperature distribution of the outdoor unit and the rooftop surface throughout the day.

Please note that while taking measurements, consider the influence of wind speed from meteorological data and compare the measurement data of days with similar meteorological conditions in terms of temperature and sunlight exposure between days with countermeasures and days without countermeasures.

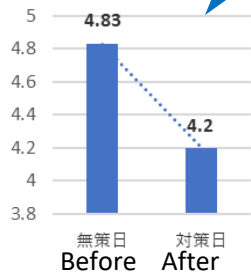
1



**The shading (shadowing) effect on the outdoor unit due to solar radiation.**

Surround the outdoor unit with a shade net (with 85% shading rate).

**Reduce the power consumption by 10% (0.63 kWh).**



At 12:00 PM in the area without installation, the power consumption was 4.83 kWh, while at 2:00 PM in the area with installation, the power consumption reduced to 4.20 kWh, confirming a 10% energy-saving effect.

### Issues

A structure that can withstand typhoons and strong winds is required

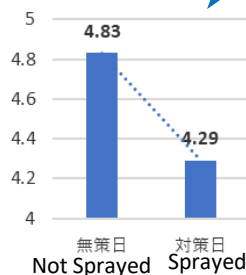
2



**Sprinkling water to the outdoor unit (4L/h)**

Attach a mist nozzle to the heat exchanger of the outdoor unit.

**Power consumption reduced by 10% (0.54kWh)**



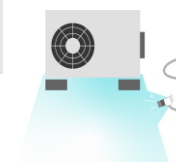
During the 12:00 PM time slot, the area without water spraying had a power consumption of 4.83 kWh, while the area where water was sprayed had a power consumption of 4.29 kWh, confirming a 10% energy-saving effect.

### Issues

If the watering amount is insufficient, It may occur:

- Adhesion of residue due to evaporation.
- Decreased heat exchange ratio and COP (Coefficient of Performance) due to scale deposition on the heat exchanger.
- Rust prevention measures for equipment are also essential.

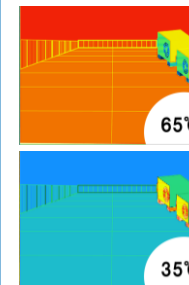
3



**Watering around the outdoor unit and rooftop floor (at a rate of 7L/m).**

Install a sprinkler tube on the rooftop and continuously water it with tap water.

**Achieve a 20% reduction in power consumption (with a 30°C temperature difference).**



Compare the average current and confirm a **nearly 20%** energy-saving effect.

- Possible factors to consider:
- Lack of insulation in the rooftop and ceiling area, leading to significant suppression of temperature rise in the ceiling area.
  - Decreased temperature around the outdoor unit installed on the rooftop, resulting in a lower intake air temperature for the outdoor unit.

### Issues

Due to the significant amount of water usage:

- Increased power consumption for the water lifting pump to supply water to the elevated water tank.
- Increased costs such as water utility fees.



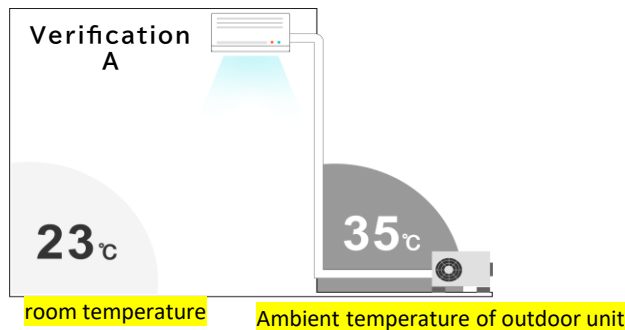
## Electric Power Research Institute (EPRI)

### Verification purpose

Regarding the air conditioner, we will verify the energy-saving effect by adjusting the indoor air conditioner's set temperature and the intake temperature of the heat exchanger around the outdoor unit.

### Measuring method

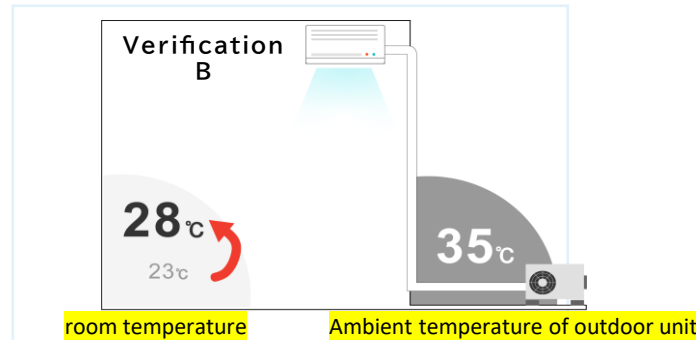
We conducted an experiment using an air conditioner installed in our Akagi Test Center's experimental house. The indoor set temperatures were set to 23°C and 28°C, while the temperatures around the outdoor unit were set to 35°C and 30°C. We applied a sensible heat load of 2.3 kW and measured the power consumption. The air conditioner used in the experiment had a rated cooling capacity of 2.2 kW and a rated COP of 5.57 (with a rated power consumption of 395 W during rated operation).



If the ambient temperature of the outdoor unit is 35°C and the indoor temperature is 23°C, the power consumption is 450W.

Verification A power consumption 450w

28%Down

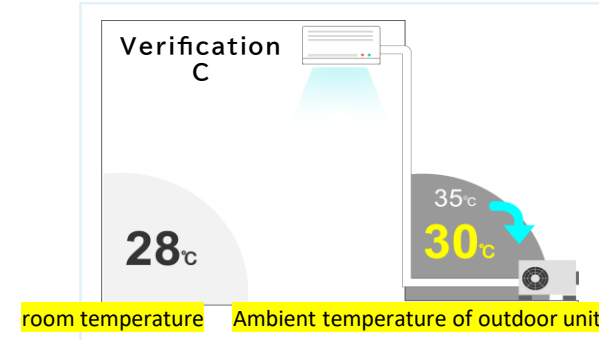


When the room temperature was raised by 5°C, the power consumption decreased by 128W compared to A.

Verification B power consumption 322w

42%Down

58%Down



Lowering the ambient temperature of the outdoor unit by 5°C reduced power consumption by 135W compared to B.

Verification C power consumption 187w

### Energy-saving effect by reducing the ambient temperature of the outdoor unit

Based on the above results, lowering the ambient temperature of the outdoor unit is effective for power saving. One way to lower the temperature around the outdoor unit is by applying heat-insulating paint to both the outdoor unit itself and its surroundings. This can effectively reduce the overall temperature and significantly reduce power consumption.

## A certain convenience store in Japan.

### Verification purpose

Verification of energy-saving effects through heat-insulating paint applied only to the outdoor unit.

### Measuring method

It applied heat-insulating paint to the outdoor units of three specific convenience stores and measured the changes in electricity consumption.



### Energy-saving effects of reducing the temperature of the outdoor unit

Energy-saving effects were observed even with heat-insulating paint applied only to the outdoor unit. In particular, the convenience store with the outdoor unit facing southwest and directly exposed to sunlight, referred to as "Saitama Store A," demonstrated the highest energy-saving rate.

The average energy savings across the three stores were as follows:

- Freezer: -9.7 kWh - Air conditioner: -6.9 kWh - Main power supply (200V): -22.5 kWh (-6.6%)

Please note that the values provided represent the energy savings achieved through the application of heat-insulating paint to the outdoor unit only.

### Here are the changes in electricity consumption before and after the application of heat-insulating paint for each store

Shop	Equipment	Electricity usage		Reduction rate (kwh)	Reduction rate (%)
		Before (6/17)	After (7/21)		
Shop A In Saitama	Freezer	135.4	131.1	-4.3	-3.2
	A/C	59.0	45.8	-13.2	-22.3
	200V	368.4	324.1	-44.3	12.0
Shop B In Saitama	Freezer	116.2	94.9	-21.3	18.3
	A/C	79.3	74.7	-4.6	-5.8
	200V	382.2	362.6	-19.6	-5.1
Shop C In Saitama	Freezer	94.7	91.2	-3.5	-3.7
	A/C	72.7	69.6	-3.1	-4.3
	200V	359	349.1	-9.9	-2.8

