Energy Saving Case Study

【Outline】
Warehouse of garment manufacture

• Date: May 2005
• Painted part: Folded plate roof (1300㎡)

【External view】

Outside of warehouse

Painted part on the roof

【Effect】

- 8.2 million YEN reduction in 10 years
- 15℃ reduction in 2nd floor, 4 to 1 air conditioner.
- No water sprinkling in summer
- Energy efficiency in winter was enhanced
- Lengthening of painting cycle

【Power consumption data (comparison of painted and no-painted period)】

Summer season

Winter season

Red line: Before painting
Blue line: Painted 5 years
Green line: Painted 10 years
● Energy Saving Case Study

【Outline】
Painted cold storage in an industry zone of inland Shimane, Japan.
・Date : May 2005
・Painted part : Folded plate roof (3800㎡) · Area : Shimane
  · Color : White (GAINA N−95)

【External view】

Painted part on the roof

【Effect】

・Temperature of outside of cold storage room went down 49 to 36℃
・Power consumption of air conditioner was significantly reduced.
・Annual peak of electricity usage was cut from 1815kw to 1600kw.

● Effects after peak cut
  ・7.4 million Yen cost cut in two years

Outside temperature : 35℃
Energy Saving Case Study

[Outline]
Painted GAINA to reduce power consumption

- Date: June 2007
- Area: Nagano, Japan
- Painted part: Folded plate roof (2940m²)
- Color: White (GAINA N—95)

[External view]

[Effects]

- Temperature of the back of ceiling was reduced 20°C in summer.
- Efficiency of air conditioner was increased in summer and winter.
- 1.4 million Yen was cut in a year.

Power consumption graph in summer and winter:

- Summer: 15% cut
- Winter: 16% cut
- 4% cut
- 19% cut
- 21% cut
Energy Saving Case Study

【Outline】
Painted to reduce heat in summer season.
- Date: June 2008
- Painted part: roof of amusement spot (2800㎡)

【External view】

【Effects】
- 10% power consumption reduction in August and September
- 1.08 million yen cut in summer four months. (1kWh=17Yen)

【Comparison of power consumption】

Before GAINA
未塗装

After GAINA
塗装後

Aug
8月

Sep
9月

50,000 100,000 150,000 200,000 250,000 300,000 350,000(kWh)
● Energy Saving Case Study

【Outline】
Painted for renovation of 3 stories of building
*Some air conditioning devices were also replaced.

• Date: March 2009
• Painted part: roof and external wall of concrete, some for interior (total: 460㎡)

【External view】

【Effects】

• before painting 0.47 million Yen, After painting 0.24 million Yen (50% cut)
• stop using heater in winter season

● power consumption graph

Before

After

【Outline】
Painted for renovation of 3 stories of building
*Some air conditioning devices were also replaced.

• Date: March 2009
• Painted part: roof and external wall of concrete, some for interior (total: 460㎡)

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● power consumption graph

Before

After

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• Painted part: roof and external wall of concrete, some for interior (total: 460㎡)

【External view】

【Effects】

• before painting 0.47 million Yen, After painting 0.24 million Yen (50% cut)
• stop using heater in winter season

● power consumption graph
● Energy Saving Case Study

【Outline】
Painted for exterior renovation
- Date: July 2011
- Painted area: Roof/external wall (Total: 200m²)

【External view】

【Effects】
Reduction of power consumption
- Summer approx 28.4%, Winter Approx 26.3%

### Comparison of power consumption

#### July to September

<table>
<thead>
<tr>
<th>Month</th>
<th>Before GAINA (Yen)</th>
<th>After GAINA (Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22' 7</td>
<td>14,240</td>
<td>10,176</td>
</tr>
<tr>
<td>8</td>
<td>14,169</td>
<td>9,805</td>
</tr>
<tr>
<td>9</td>
<td>11,084</td>
<td>8,289</td>
</tr>
<tr>
<td>Total</td>
<td>39,493</td>
<td>28,270</td>
</tr>
</tbody>
</table>

#### November to February

<table>
<thead>
<tr>
<th>Month</th>
<th>Before GAINA (Yen)</th>
<th>After GAINA (Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22' 12</td>
<td>24,505</td>
<td>19,958</td>
</tr>
<tr>
<td>23' 1</td>
<td>20,562</td>
<td>13,423</td>
</tr>
<tr>
<td>2</td>
<td>14,912</td>
<td>10,800</td>
</tr>
<tr>
<td>Total</td>
<td>59,979</td>
<td>44,181</td>
</tr>
</tbody>
</table>
Energy Saving Case Study

【Outline】
Painted Yonahara town office, under the public project of thermal insulation of government buildings in Okinawa prefecture
※some wind film and air conditioner were replaced too.

- Date : March 2011
- Area : Yonahara, Okinawa
- Painted part : concrete roof (1030㎡)
- Concrete external wall (1500㎡)
- Color : White (N−95) Roof
- Grey (N−70) Wall

【External view】

Before

After

【Effects】

- 1.41 million Yen cut in a year
- Penetrating cold in winter was reduced.

● power consumption graph
Energy Saving Case Study

【Outline】
Painted logistic center
- Date: March 2009
- Painted part: Galvalume plate roof (2200m²)

- Area: Okinawa, Japan
- Color: White (N—95)

【External view】

【Effects】

Tested inside temperature of two buildings (photo above) under the same condition. Temperature of the backside of roof was reduced at maximum 8.9℃, average 5.3℃.

<table>
<thead>
<tr>
<th>figure</th>
<th>Temperature of the backside of roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Not painted</td>
<td>36.7℃</td>
</tr>
<tr>
<td>painted</td>
<td>31.4℃</td>
</tr>
<tr>
<td>reduction</td>
<td>−5.3℃</td>
</tr>
</tbody>
</table>

※Max temp: 33.0℃, Average temp: 29.6℃
Energy Saving Case Study

[Outline]
Compared temperature on the roof of warehouse
- Date: September 2008
- Painted part: Concrete roof (1420㎡)

- Area: Tokyo
- Color: GAINA N-70

[External view]

[Effects]
- Surface temperature was significantly reduced

<table>
<thead>
<tr>
<th></th>
<th>No painted side</th>
<th>Painted side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>44 ~ 48℃</td>
<td>35 ~ 40℃</td>
</tr>
</tbody>
</table>

Painted part

Thermography

※Date: Sep 2008 13:00pm
Temperature: 33℃
Painted roof to compare the temperature

- Date: August 2009
- Painted part: Folded plate roof (307㎡)

**Energy Saving Case Study**

**Outline**

- Painted roof to compare the temperature
  - Date: August 2009
  - Painted part: Folded plate roof (307㎡)

**External view**

- Area: Chiba, Japan
- Color: White (GAINA N—95)

**Effects**

- Temperature of surface and back of roof was significantly reduced.

<table>
<thead>
<tr>
<th></th>
<th>No painted side</th>
<th>Painted side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>44℃</td>
<td>33℃</td>
</tr>
<tr>
<td>Back of roof</td>
<td>41.5℃</td>
<td>33.5℃</td>
</tr>
</tbody>
</table>

Before painting

After painting

※Date: Sep 2009 13:00pm
Temperature: 33℃
● Energy Saving Case Study

【Outline】
Painted roof of warehouse and office

• Date: June 2010
• Painted part: Color steel plate roof (1200㎡)

【External view】

External view

Painted part

【Effect】

• Temperature of back of roof was reduced at maximum 19.5℃, on the average 5.9℃.
• Property of heat was changed, air conditioner could work faster.

<table>
<thead>
<tr>
<th>Figure</th>
<th>Date</th>
<th>Temp. of backside of roof</th>
<th>Weather</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td>Maximum</td>
</tr>
<tr>
<td>Before GAINA</td>
<td>27th June</td>
<td>37.0℃</td>
<td>55.5℃</td>
</tr>
<tr>
<td>After GAINA</td>
<td>17th July</td>
<td>31.1℃</td>
<td>36.0℃</td>
</tr>
<tr>
<td>GAINA</td>
<td>—</td>
<td>−5.9℃</td>
<td>−19.5℃</td>
</tr>
</tbody>
</table>

※before (27 Jun) Max: 32.0℃, Average: 29.0℃
※after (17 Jul) Max: 32.2℃, Average: 29.3℃
● Energy Saving Case Study

【Outline】
Painted roof of factory to compare the temp.
・Date: September 2010
・Painted part: Folded plate roof (2838㎡)

【Exterior】

【Effects】
・Temperature of surface of roof was significantly reduced.

<table>
<thead>
<tr>
<th></th>
<th>No painted side</th>
<th>Painted side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folded plate roof</td>
<td>57 ~ 62℃</td>
<td>35 ~ 40℃</td>
</tr>
</tbody>
</table>

Painted part

thermography

※date: Sep 2010 13:00pm
Temperature: 33℃
Energy Saving Case Study

Outline

Painted roof of hypermarket
- Date: July-August 2011
- Area: Fukushima, Japan
- Painted part: Galvalume plate roof (10600㎡)

External view

Structure of roof:
- Galvalume plate roof
- Air layer 1000mm
- Glass wool 100mm
- Gyptone 9.5mm

Effect

- 20% of energy saving in a year
- 7.1 million Yen was cut in a year (※13Yen／kWh conversion)

Power consumption graph

(kWh)

<table>
<thead>
<tr>
<th>Month</th>
<th>Consumption [Painted]</th>
<th>Consumption [After Painting]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3月</td>
<td>200000</td>
<td>180000</td>
</tr>
<tr>
<td>4月</td>
<td>210000</td>
<td>190000</td>
</tr>
<tr>
<td>5月</td>
<td>220000</td>
<td>200000</td>
</tr>
<tr>
<td>6月</td>
<td>250000</td>
<td>230000</td>
</tr>
<tr>
<td>7月</td>
<td>300000</td>
<td>280000</td>
</tr>
<tr>
<td>8月</td>
<td>320000</td>
<td>300000</td>
</tr>
<tr>
<td>9月</td>
<td>280000</td>
<td>260000</td>
</tr>
<tr>
<td>10月</td>
<td>240000</td>
<td>220000</td>
</tr>
<tr>
<td>11月</td>
<td>210000</td>
<td>190000</td>
</tr>
<tr>
<td>12月</td>
<td>180000</td>
<td>160000</td>
</tr>
<tr>
<td>1月</td>
<td>150000</td>
<td>130000</td>
</tr>
<tr>
<td>2月</td>
<td>120000</td>
<td>100000</td>
</tr>
</tbody>
</table>