GAINA

Case Studies
● 2012 Energy saving paint products market share figure

GAINA keeps the top share in three years!

- Nissin Sangyo, [値]
- Nippon Paint [値]
- SK Kaken [値]
- Japan Special Paint [値]
- Mira Cool Paint [値]
- Asteck Paint [値]
- Kansai Paint [値]
- Daido Paint [値]
- Dai Nippon Paint [値]
- Chuo Paint [値]
- Nippon Sangyo, [値]
- Others 13%
- Suzuka Fine
● 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)
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 m²)
  - 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°C
- 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

Before GAINA

<table>
<thead>
<tr>
<th>Room temp.</th>
<th>50~60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cold storage</td>
<td>3~5°C</td>
</tr>
</tbody>
</table>

After GAINA

<table>
<thead>
<tr>
<th>Room temp.</th>
<th>36~40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cold storage</td>
<td>3~5°C</td>
</tr>
</tbody>
</table>

Outside temperature: 35°C
● Energy Saving Case Study

【Outline】
Painted GAINA to reduce power consumption
• Date: June 2007
• Painted part: Folded plate roof (2940㎡)
• Area: Nagano, Japan
• Color: White (GAINA N—95)

【External view】

【Effects】
• Temperature of the back of ceiling was reduced 20℃ 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

<table>
<thead>
<tr>
<th></th>
<th>Summer 15% cut</th>
<th>Winter 16% cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>7月</td>
<td>145000</td>
<td>140000</td>
</tr>
<tr>
<td>8月</td>
<td>120000</td>
<td>120000</td>
</tr>
<tr>
<td>11月</td>
<td>100000</td>
<td>100000</td>
</tr>
<tr>
<td>12月</td>
<td>100000</td>
<td>100000</td>
</tr>
<tr>
<td>1月</td>
<td>100000</td>
<td>100000</td>
</tr>
</tbody>
</table>

(kwh)
Energy Saving Case Study

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

【External view】

Area: Saitama, Japan
Color: White GAINA N—95

【Effects】

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

Comparison of power consumption

Before GAINA

After GAINA

Aug
rush
Sep
**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]**

Before

After

**[Effects]**

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

**power consumption graph**

<table>
<thead>
<tr>
<th>1月</th>
<th>2月</th>
<th>3月</th>
<th>4月</th>
<th>5月</th>
<th>6月</th>
<th>7月</th>
<th>8月</th>
<th>9月</th>
<th>10月</th>
<th>11月</th>
<th>12月</th>
</tr>
</thead>
<tbody>
<tr>
<td>¥65,000</td>
<td></td>
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<tr>
<td>¥10,000</td>
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</tr>
</tbody>
</table>

No GAINA  Blue: 未塗装  Red: 塗装後
With GAINA
● Energy Saving Case Study

【Outline】
Painted for exterior renovation

• Date: July 2011
• Painted area: Roof/external wall
  (Total: 200㎡)

【External view】

Before

After

● Area: Kochi, Japan
● Color: Grey (N-50) Roof
  Ivory (25–92B) External wall
  Medium grey (25-60B) External wall

【Effects】

Reduction of power consumption
  • Summer approx 28.4%、Winter Approx 26.3%

July to September
Comparison of power consumption

<table>
<thead>
<tr>
<th>Before GAINA</th>
<th>After GAINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>month</td>
<td>power (Yen)</td>
</tr>
<tr>
<td>22’7</td>
<td>14,240</td>
</tr>
<tr>
<td>8</td>
<td>14,169</td>
</tr>
<tr>
<td>9</td>
<td>11,084</td>
</tr>
<tr>
<td>total</td>
<td>39,493</td>
</tr>
</tbody>
</table>

November to February
Comparison of power consumption

<table>
<thead>
<tr>
<th>Before GAINA</th>
<th>After GAINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>month</td>
<td>Power (Yen)</td>
</tr>
<tr>
<td>22’12</td>
<td>24,505</td>
</tr>
<tr>
<td>23’1</td>
<td>20,562</td>
</tr>
<tr>
<td>2</td>
<td>14,912</td>
</tr>
<tr>
<td>Total</td>
<td>59,979</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】

【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 (2200㎡)

【External view】

Building to compare

Painted building

【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℃

No painted part

Temperature is keeping cool in painted part.
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>No painted side</th>
<th>Painted side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>44 ~ 48℃</td>
</tr>
</tbody>
</table>

※Date: Sep 2008 13:00pm
Temperature: 33℃
Energy Saving Case Study

Painted roof to compare the temperature

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

**External view**

Before painting

After painting

**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>

※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㎡)

Area: Okinawa, Japan
Color: White GAINA N—95

【External view】

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>Painted part</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>

※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 (*13 Yen/kWh conversion*)

**Power consumption graph**

(kWh)

<table>
<thead>
<tr>
<th></th>
<th>3月</th>
<th>4月</th>
<th>5月</th>
<th>6月</th>
<th>7月</th>
<th>8月</th>
<th>9月</th>
<th>10月</th>
<th>11月</th>
<th>12月</th>
<th>1月</th>
<th>2月</th>
</tr>
</thead>
<tbody>
<tr>
<td>塗装前</td>
<td>20000</td>
<td>18000</td>
<td>19000</td>
<td>22000</td>
<td>23000</td>
<td>25000</td>
<td>28000</td>
<td>27000</td>
<td>26000</td>
<td>24000</td>
<td>25000</td>
<td>23000</td>
</tr>
<tr>
<td>塗装後</td>
<td>18000</td>
<td>16000</td>
<td>17000</td>
<td>19000</td>
<td>21000</td>
<td>22000</td>
<td>24000</td>
<td>23000</td>
<td>22000</td>
<td>20000</td>
<td>21000</td>
<td>19000</td>
</tr>
</tbody>
</table>
Why GAINA?

- GAINA was applied to the deck of large carrier.

  Temperature **65°C** to **38°C** reduction.

  Working condition inside vessel got more comfortable.

  Thermal condition was changed significantly in a week. The deck was exposed to much amount of UV. After careful selection, we decided to apply GAINA as our standard painting. (Comment of Mitsui Shipping Co., Ltd.)
Why GAINA?

To maintain national treasure, we have spent a lot in air conditioning. To increase thermal insulating function, we chose GAINA.

GAINA and Non Ketsuro (No Due) have been studied carefully in our museum. We highly evaluate its thermal insulating property, high durability against rust, and design.

(Comment of the staff in charge of design)
Here is
GAINA

Kansai Int’l airport
Train “Wing Shuttle”

Why GAINA?

• Applied GAINA to the roof of Kansai International Airport Express Train (AGT).

Temperature of the backside of roof was decreased 57°C to 47°C, energy efficiency of air conditioner was increased. GAINA was adopted as the energy saving technology of Kansai International airport.
Reduction of power consumption with GAINA

External device of Air Conditioner of restaurant chain

After painting (per a day)

974 kwh → 898 kwh

Monthly

47,000 Yen reduction
Factory of automobile
compared temperature by thermography

54.8°C → 44.6°C
Passenger boarding bridge (PBB) of Tokyo International Airport (Haneda). GAINA was applied to the Gate No.10.
Designed architecture "Minna-no-Ie (Everyone's house)" that was awarded in Golden Lion Prize (1st prize) at 13th Venice Viennale international architecture exhibition applied GAINA to its interior and exterior design.

Architect: Mr. Toyoo Itou, Ms. Kumiko Inui, Mr. Sosuke Fujimoto, Mr. Akihisa Hirata