Efforts against Global Warming by the Sanitary Equipment Industry - FY 2018 Results for Low Carbon Society Achievement Plan -

22nd January 2020
Japan Sanitary Equipment Industry Association
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0. Things pointed out from the council of CO₂ reduction of the last year

- **Main comments and findings from the council**
  - Is it possible to add illustrations of manufacturing processes and some pictures of examples to the survey form (Word document)?

- **Revisions in FY2019 reflecting the comments described above**
  - Add illustrations of manufacturing processes and some pictures of examples to the survey form (Word document).
1. Overview of Sanitary Equipment Manufacturing Industry

- Manufacturing Industry of Sanitary Equipment
  - Toilet bowls, urinals, wash basins, etc.
  - Water related equipment (residential, public)

- Industry size (FY 2018)
  - Number of companies: 3
  - Participating companies: Janis Ltd., TOTO Ltd., LIXIL corporation (in alphabetical order)
  - Market size: approximately 674.4 billion yen

- Current State of Industry
  - The industry’s production value, which is an indicator of the amount of production activity, increased approximately 32.5 billion yen (5.5% up) from the previous year. One of the reasons is that consumers tend to buy high-value-added products due to strong domestic demand for renovation. It is also owing to increasing demand for public products from tourist facilities for the upcoming Olympic and Paralympic Games and increased number of foreign visitors to Japan (29 million in 2017→31 million in 2018).
  - The market size of housing renovation, which has a great impact on the industry, was 6,217.8 billion yen in FY2018 (0.9% down from previous year). The total number of housing starts in FY2018 was 940,000 units, 2.3% down from 960,000 units of the previous year.
Overview of sanitary ceramics production process (representative products of the industry)
- About 60% of energy consumption in sanitary ceramics production process is in the firing process.
- Energy consumption of the entire industry including other production processes is about 60% of electricity, about 40% of fuel.
1. Overview of Sanitary Equipment Manufacturing Industry

- Participation in the Japan Business Federation (Keidanren) Environment Voluntary Action Plan (global warming countermeasures・low carbon society achievement plan)
  - In FY 2001, the former Japan Sanitary Equipment Industry Association set goals and launched Voluntary Action WG.
  - In April 2015, the “Japan Toilet Seat Association” was merged into the “Japan Sanitary Equipment Industry Association” and each Sanitary Equipment Manufacturing company continued to work as Voluntary Action WG.

<table>
<thead>
<tr>
<th>Year</th>
<th>Details</th>
</tr>
</thead>
</table>
| FY 2001 | Participated in the 4th Japan Business Federation Voluntary Action Plan Follow-up (Global Warming Countermeasures). The former Japan Sanitary Equipment Industry Association set goals.⇒ Launched Voluntary Action WG
⇒ "Reduce CO₂ emissions from production plants in FY 2010 by 20% or more compared to FY 1990 levels". |
| FY 2005 | Started participating in and reporting for Ministry of Economy, Trade and Industry "Global Warming Countermeasure Efforts". |
| FY 2007 | Target value increased.
"Reduce the average amount of CO₂ emissions of 5 years from FY 2008 to FY 2012 (first commitment period of the Kyoto Protocol) generated in production plants by 25% or more compared to FY 1990 levels" |
| FY 2010 | Reduction target of the Japan Business Federation Environmental Headquarters "Low Carbon Society Achievement Plan (Phase I) following Voluntary Action Plan"
⇒ "Reduce CO₂ emissions from production bases in FY 2020 by 35% or more compared to FY 1990 levels." |
| FY 2013 | End report for the first commitment period designated in the Kyoto Protocol. The target of Voluntary Action Plan was achieved. ⇒ Average amount of CO₂ emissions of the period from FY 2008 to FY 2012: reduction of 50.3% (compared to FY 1990) |
| FY 2014 | Considered and reported the reduction target for FY 2020 and after (of Low Carbon Society Achievement Plan (Phase II))“. ⇒ Improve CO₂ emissions basic unit from production bases in FY2030 by 49% compared to FY2005 levels. |
| FY 2017 | Reviewed CO₂ reduction target of both FY2020 and FY2030. |
2. Overview of "Low Carbon Society Achievement Plan"

- **Target Index: CO₂ emissions**
  - FY 2020 (*revised in 2017)*
    Reduce CO₂ emissions in FY 2020 generated at production bases by **50% compared to FY 1990**.
  - FY 2030 (*revised in 2017)*
    Reduce CO₂ emissions in FY 2030 generated at production bases by **55% compared to FY 1990**.

- **Background on Target Revision**
  - The amount of reduced CO₂ emissions exceeded the Target level set in 2010 and 2015 due to the hard work of individual company.

- **Reason for setting target level and its Validity**
  The target level was set based on forecast of think tanks etc. by taking into consideration the following assumptions.
  - Decrease in new housing starts
  - Slight increase in renovation demand
  - CO₂ emissions reduction through energy-saving activities of individual company
  - CO₂ emissions increase due to the improvement of working environment (additional installation of air conditioning at factories, etc.) as part of work style reforms.

- **Applicable business scope**
  - **Domestic production bases** for sanitary equipment of each company which participates in the Low Carbon Society Achievement plan
3. Reduction of CO₂ emissions in FY2018

- CO₂ Emissions: 205,000 t-CO2 (reduction of 58.7% vs. FY 1990)

**FY 2018 Achievements**

Voluntary Action Plan  
Low Carbon Society Achievement Plan

- Reduction of 50% (compare to FY 1990)

【Factor analysis】

Though the CO₂ conversion factor 2018 for electricity decreased (4.96 →4.63), CO₂ emissions increased due to investment in mechanization and automation for higher work-efficiency and avoidance of labor shortages, additional installation of air conditioning in factories for better labor environments as parts of workstyle reforms, as well as increased demand for high-value-added products which require more workload and parts.
Continued highly efficient manufacturing through renovation of manufacturing facilities also in FY 2018.
- Each company promoted energy-saving measures, such as upgrading to energy-saving equipment and improving equipment efficiency.
- Shifting to frequent and smaller measures and yet continuing investment in CO₂ reduction projects.

3. Reduction of CO₂ emissions in FY2018 ②

<table>
<thead>
<tr>
<th>Major measures implemented in FY 2018</th>
<th>CO₂ Reduction per FY (t-CO₂)</th>
<th>Investment Amount (thousand yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy-saving measures eg. Introduction of LED lights</td>
<td>3,665</td>
<td>194,000</td>
</tr>
<tr>
<td>Compressor updated</td>
<td>13</td>
<td>1,746</td>
</tr>
<tr>
<td>Introduction visualization system</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>Substation updated</td>
<td>46</td>
<td>184,600</td>
</tr>
<tr>
<td>Production facilities updated</td>
<td>152</td>
<td>585,533</td>
</tr>
<tr>
<td>Consolidation and enhancement of process</td>
<td>69</td>
<td>206,500</td>
</tr>
<tr>
<td>Total</td>
<td>3,948</td>
<td>1,172,679</td>
</tr>
</tbody>
</table>

Upgraded to the latest compressor (w/ highly efficient, visualization system)

LED lights
4. Contribution through other sectors’ efforts for promotion of low-carbon products and services

- Improvement and dissemination of low-carbon products
  - Improved performance of water conserving toilets, integrated bidet toilet seats, etc.
  - Educational activities on Japan Sanitary Equipment Industry Association website.

**Toilet Bowl Flush Water Volume**

1970s: 13 liters ⇒ 1990s: 8 liters ⇒ 2006 and later: 6 liters

**Energy saving bidet toilet seat (FY 2018 vs FY 2008)**

- Hot water storage type: about 16% energy saving
- On-demand type: about 33% energy saving

**Eco-friendly toilets**

**Water-saving toilets • CO₂ reduction**

Does the toilet save the Earth?
If a 13-liter flush toilet is replaced by 6-liter flush toilet, it is going to reduce 26.7kg CO₂ a year.
This means changing to the latest model with small flush water volume saves not only water, but also reduces CO₂ emissions. This leads to Eco-friendly life.

If all toilets are replaced by 6-liter flush toilets..., The amount of water saved will be 1,943,449m³ a day and 709,358,885m³ a year!

**Eco-friendly toilets**

**Energy-saving bidet toilet seats**

Bidet toilet seat is “a seat that has function to cleanse bottom with hot water”.
According to the Cabinet survey (March 2017), penetration rate for households is about 80%.
This means many families use Bidet toilet seats. Energy-saving products save electricity charge and reduce CO₂ emissions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Hot Water Storage Type</th>
<th>On-Demand Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>202 kWh/year</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>170 kWh/year</td>
<td>86 kWh/year</td>
</tr>
</tbody>
</table>

Hot water storage type: System where water in tank is heated with a heater, and abundant amount of hot water is available. However, electricity to maintain heated water is necessary.
On-demand type: No tank, water is instantly heated each time used. Electricity to maintain heat is unnecessary and power consumption is less than "Hot water storage type", however the amount of hot water is limited. Additionally, a large amount of power is needed instantly.
4. Contribution through other sectors’ efforts for promotion of low-carbon products and services

- Efforts by Operations Division
  - Each individual company promotes company-wide CO₂ reduction activities involving Operations Division.

- Initiatives by Transport Division
  - Each company as a consignor, collaborates with transport companies to carry out measures to improve transport efficiency.
  1) Review logistics plan (development of redistribution bases, routine routes pickup, etc.)
  2) Improve transport efficiency (loading efficiency, request eco-driving to drivers etc.)

- Efforts to dispatch information (in Japan)
  - Industry Association: Introduce CO₂ emissions reduction efforts through water conservation on website.
  - Individual Companies: Posted environmental initiatives on each company’s website.

http://www.janis-kogyo.co.jp/aboutus/quality_control.html
4. Contribution through other sectors’ efforts for promotion of low-carbon products and services ③

■ Dispatch information (to overseas)
- Contribution to the environment is introduced on the Association’s web site, “Toilet Navigation”.

TOILET NAVIGATION (Japanese)
http://www.sanitary-net.com/

TOILET NAVIGATION (English)
http://www.sanitary-net.com/global
5. Promotion of International Contribution

- International Contribution through Dissemination of Water Conserving Toilets
  - Through participation in the promotion (Ministry of Economy, Trade and Industry Policy, Construction Materials Industry Association Contracted Project) of Green Construction Materials Business (common name), disseminate Japan's water conserving toilet standards - satisfaction in all the performance, not just "water conserving" but also ① bowl surface washing, ② flushing performance ③ conveyance performance - to ASEAN countries.
  - Each individual company works on “globally launching and promoting water conserving products”, "providing simplified toilet pans that need only a small amount of water to flush” and so on.

- Water saving toilets
  - Vietnam (Green-label Plan)
    - Consideration of Green-label criteria
    - Technical Support when necessary
  - Indonesia
    - Follow up on the process of issuing “water conserving toilet” standard
  - Other ASEAN countries (Thailand & Myanmar)
    - Considering starting new projects

Achievements of FY 2018: CO₂ emissions reduced by 3.23 million tons
- Water conserving toilet shipment ratio / Domestic & Overseas 79%
- Water consumption in product use/ 860 million m³ reduction

Participation in promotion of Green Construction Materials Business (common name)
Global Introduction and Dissemination of Water Conserving Products (Individual Companies)
6. Development and Introduction of Innovative Technologies

- **Best Practice, Introduction and promotion of BAT**
  - Lights switched to LED (Aiming at 100% penetration in FY2020)
  - Introduce highly efficient equipment in practical stages when updating production facilities. Maximize and promote introduction of the latest energy saving equipment for production base infrastructure such as air conditioning, lighting equipment, compressors, etc.,

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**Introduction of BAT**

- LED lights
- Higher-efficient air conditioning (individually controllable, ductless multi-cubes)
- Upgraded to highly efficient, visualization system mounted compressor
- Top runner spec. energy efficient pump unit

* BAT : Best Available Technology
7. Reduction Target for after FY 2020 (set in 2017)

- Low Carbon Society Achievement Plan Phase II (2030) (Reviewed in FY 2017)
  - **Reduction target:** Reduce CO₂ emissions by 55% in 2030 compared to FY 1990.
  
  *FY 2030 CO₂ emissions : 223,000t – CO₂ (Benchmark FY, FY 1990)*

  Note: Actual CO₂ emissions will be monitored every FY and the validity of the target value will be verified. (Benchmark year and target value will be reviewed every 3 years as a general rule).

- Basis for target setting
  - Predicting the mid-long term demand for housing equipment is not easy, however, the volume of production activity is expected to remain steady on the following assumptions of Think Tanks and others:
    - decline in the number of new housing starts in Japan
    - slight increase in demand for the home renovation
    - No expansion but steady growth of the housing construction materials market in the long term.
  - While CO₂ emissions are expected to reduce due to each individual company’s energy-saving activities, CO₂ emissions are predicted to increase as a result of improving working environment (e.g. additional installation of air conditioning at factories) as part of workstyle reforms.
Fuel conversion of existing kilns (shift to small CO₂ emission factor fuel), which can expect significant CO₂ emissions reduction, has completed. While measures are shifting to more frequent and smaller ones, investment in CO₂ reduction projects continues. The total reduction of CO₂ emissions and investment amount: about 92 thousands t- CO₂, 14.4 billion yen.

<table>
<thead>
<tr>
<th>FY</th>
<th>Total reduction of CO₂ (t -CO₂)</th>
<th>Total investment amount (1,000 yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2,075</td>
<td>54,000</td>
</tr>
<tr>
<td>2001</td>
<td>5,460</td>
<td>98,200</td>
</tr>
<tr>
<td>2002</td>
<td>6,200</td>
<td>127,000</td>
</tr>
<tr>
<td>2003</td>
<td>3,523</td>
<td>46,400</td>
</tr>
<tr>
<td>2004</td>
<td>5,580</td>
<td>292,450</td>
</tr>
<tr>
<td>2005</td>
<td>1,669</td>
<td>333,800</td>
</tr>
<tr>
<td>2006</td>
<td>2,591</td>
<td>201,222</td>
</tr>
<tr>
<td>2007</td>
<td>4,823</td>
<td>521,586</td>
</tr>
<tr>
<td>2008</td>
<td>2,266</td>
<td>152,224</td>
</tr>
<tr>
<td>2009</td>
<td>3,783</td>
<td>534,014</td>
</tr>
<tr>
<td>2010</td>
<td>4,074</td>
<td>173,780</td>
</tr>
<tr>
<td>2011</td>
<td>4,657</td>
<td>4,081,050</td>
</tr>
<tr>
<td>2012</td>
<td>7,168</td>
<td>1,103,650</td>
</tr>
<tr>
<td>2013</td>
<td>15,083</td>
<td>1,963,178</td>
</tr>
<tr>
<td>2014</td>
<td>4,420</td>
<td>289,867</td>
</tr>
<tr>
<td>2015</td>
<td>5,606</td>
<td>1,052,126</td>
</tr>
<tr>
<td>2016</td>
<td>6,387</td>
<td>659,563</td>
</tr>
<tr>
<td>2017</td>
<td>3,050</td>
<td>1,588,286</td>
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JAPAN SANITARY EQUIPMENT INDUSTRY ASSOCIATION

http://www.sanitary-net.com/

Happy life with Toilets