

**Presentation 3.4:** Financing energy efficiency projects for climate change mitigation: the Energy Efficiency 21 Project – EE21

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**Abstract**

Global warming is crucial issues, and Japanese business community shares the thought that it will take a long time to solve the issues. Nippon Keidanren has made efforts against the issues since 1996. Also, the Japan Paper Association (JPA) established the voluntary action plan with the targets to reduce fossil energy consumption per unit production and to expand forest plantation area at home and abroad. Furthermore, in 2004, JPA raised the targets and newly set a target to reduce CO<sub>2</sub> emission per unit production. Only the paper industry has strengthened its voluntary efforts.

As concrete measures for the achievement of the targets, the industry has been promoting the introduction of energy-efficient equipment and energy conversion to biomass energy, new fuel such as waste tires, and natural gas. JPA confirms progress by collecting energy saving projects and their results from member companies every year. JPA's efforts against global warming is focused on energy saving which brings cost reduction to a company. As a result, companies have achieved good results on global warming. From the point of view that information disclosure plays a great role in promoting inter-enterprise competition, JPA launched information disclosure to participating companies in the action plan in 2005 to enable them to watch their efforts each other.

Life Cycle Inventory (LCI) works as a benchmark to support voluntary efforts. However, when we use LCI as the benchmark, we need to make the same conditions, as production mix of paper differs by company and region. JPA made a survey of LCI of major six paper grades and announced the results. At present, JPA is making a survey of LCI of major five paperboard grades and is scheduled to announce the results in at the end of 2006. We plan to update the LCI results periodically. LCI should be used as the benchmark for time-series comparison to the progress of energy saving. There are many problems with LCI as a tool for inter-company comparison and interregional comparison, because type of equipment, product mix, quality and raw material condition in the paper industry differs by company and country, we should be careful to make absolute comparison of LCI as the benchmark.

ICFPA should set the basic position of the world paper industry including developing countries against global warming issues, and promote the acceleration of the industry's efforts against the issues. It is our belief that scheme like JPA's voluntary action plan is effective as future measures against global warming in each region.



## Voluntary Efforts against Global Warming and Benchmark

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## Japan Paper Association (JPA)

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- Established in April 1972 through the merger of the Pulp and Paper Industry Association, originally established in 1946 with other Associations related to paperboard and pulpwood.
- Business  
A trade association which consists of major pulp and paper manufacturers in Japan.
- Member
  - Regular members  
38 companies and 7 associations
  - Supporting members  
71 companies and 1 association
- Paper and paperboard production among member companies  
28,000,000 t/year  
→ **accounting for 88% of domestic production**

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## JPA's Voluntary Action Plan on Global Warming

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- **Established in Jan. 1997.**
  - Major targets
    1. By 2010, reduce fossil energy consumption per unit by 10% over 1990 levels.
    2. By 2010, expand the forest plantation area to 550,000 hectares.
- **In Nov. 2004, revision on the action plan**
  1. By 2010, reduce fossil energy consumption per unit by 13% over 1990 levels.
  2. By 2010, reduce CO<sub>2</sub> emission per unit by 10% over 1990 levels.
  3. By 2010, expand the forest plantation area to 600,000 hectares.
- **Conversion to non-fossil energy**
  - Waste wood, waste products, refuse paper and plastic fuel (RPF) etc.
- **Introduction of energy-efficient equipment.**
  - **Cost reduction.**

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## Development of the Action Plan

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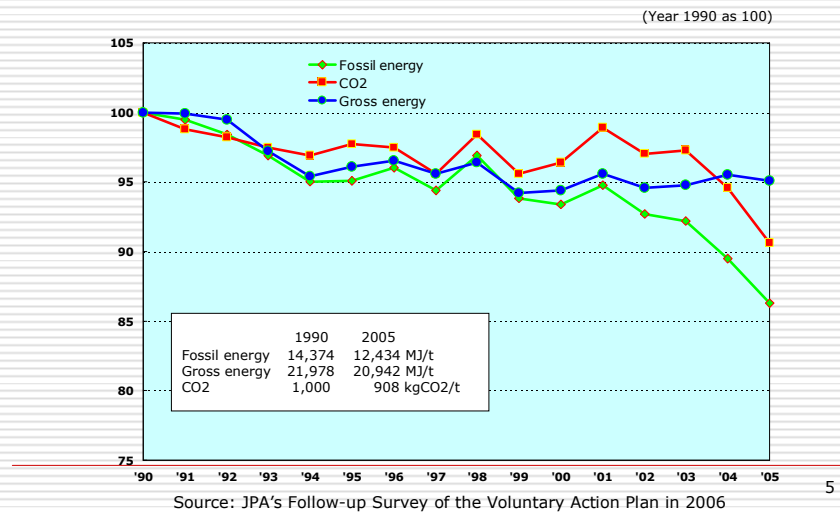
- 1996: Target setting based on member's questionnaire.  
Jan.1997: Establishment of the Action Plan.
- 1998: Drawing up the form of a follow-up survey,  
started data collection.  
Contents of the data:  
Energy consumption, paper and paperboard production,  
implemented energy conservation measures, future energy  
conservation plans  
(Individual member's data is not publicly opened).
- 2004: Survey of medium term large-scale investment project.  
Nov. 2004: Revision of the Action Plan.  
May 2005: **Information disclosure among member companies.**
- Dec. 2005: LCI survey of main paper grades.

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## Progress of the Voluntary Action Plan

### Energy Consumption per Unit and CO<sub>2</sub> Emissions



## Measures against Global Warming

- **High-temp. & high-pressure operation in Recovery boiler**  
(10Mpa,500C<. 50 percent penetration in Japan  
→further expansion in the future)
- **New fuel boiler**  
construction wood wastes, RPF, waste plastics, waste tires  
Use of paper sludge and TOC wastewater as fuel
- Fuel conversion from heavy oil to natural gas
- **Expansion of recovered paper utilization in paper production**  
Reduction of energy consumption in pulping and beating process  
(Started with the substitutes for mechanical pulp for newsprint  
→extend to the substitutes for kraft pulp)

## Measures against Global Warming

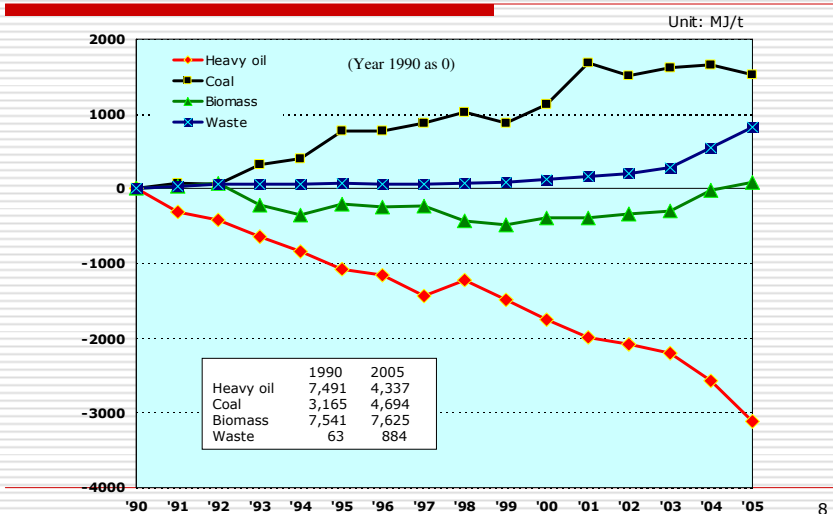
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- ❑ Dew point control with closed dryer hood
- ❑ Spread of medium-consistency pulp screening and washing facility
- ❑ Water saving  
Reduction of energy consumption in water supply system,  
improvement in retention of raw material, waste heat reduction
- ❑ Spread of energy-efficient refiner and pulper
- ❑ Inverter Control of pump and rotary machines
- ❑ Improvement in the efficiency of machine through stable operation

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## Progress of the Voluntary Action Plan

Consumption per Unit by Fuel



## Life Cycle Inventory (LCI) as a Benchmark

### □ Objective

1. Among public institutions, academic experts and the consumer public, increase awareness of the deterioration in fossil energy consumption per unit caused by an improvement in the utilization of recovered paper.
2. Promote further improvement in energy consumption per unit by understanding one's own position relative to the industry standard and sharing information between member companies.

### □ Action & Public announcement

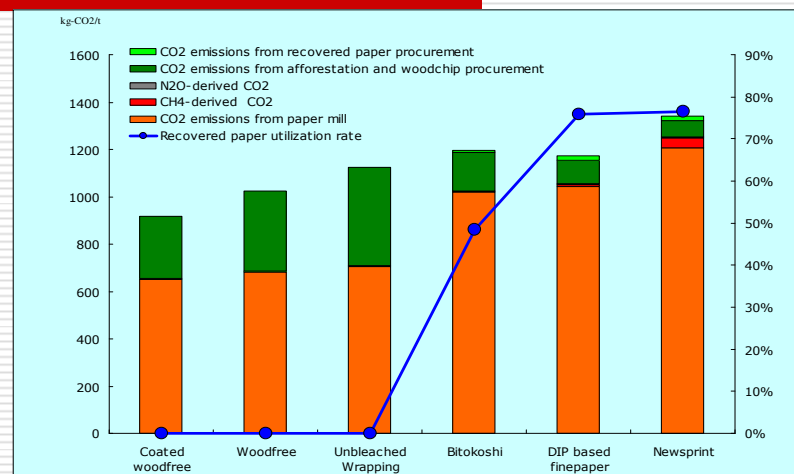
1. LCI of Paper and paperboard (Oct. 2002)
2. LCI of six major paper grades (Dec. 2005)
3. LCI of five major paperboard grades (scheduled for Dec. 2006)
4. Recollection of LCI in every five years (2010?)

### □ Data

1. Boundary: from raw material procurement to product shipment.
2. Participating company : members of LCI/eco-label research group.

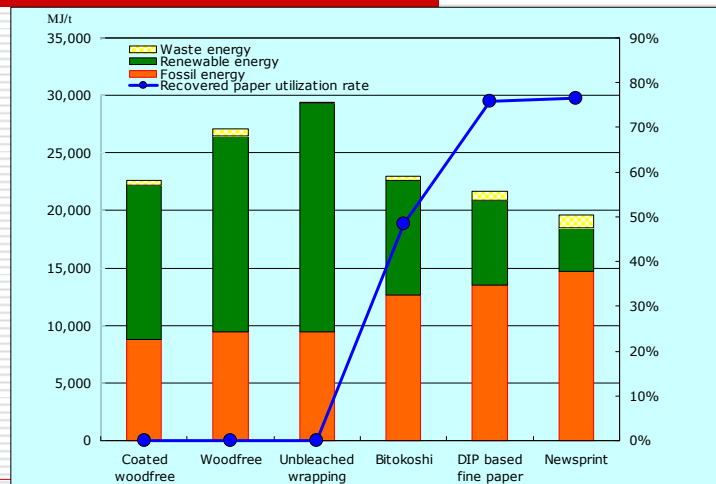
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## CO<sub>2</sub> emissions and Recovered Paper Utilization by Grade



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## Energy Consumption and Recovered Paper Utilization by Grade



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## Limitation of LCI as Benchmark

1. For kraft pulp-based paper mill, black liquor constitutes a significant proportion of fuel consumption, and fossil fuel a much smaller one.
2. A mechanical pulp or recovered paper-based paper mill needs a large amount of fossil energy and purchased electricity.
3. Even among kraft pulp-based mills, the main raw material (softwood or hardwood) causes difference in the LCI. Softwood generates a large amount of black liquor, but requires more energy for its pulping process than hardwood.
4. Mills with a high degree of dependence on woodchip imports cannot use wood derived by-products, and consume a large amount of energy in woodchip transportation.
5. For Europe and North America, natural gas is easily available. Conversely, it is hard for Japan due to inadequate infrastructure.

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## Limitation of LCI as Benchmark (cont.)

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6. Integrated kraft pulp and paper mills have a well-developed cogeneration system, with high energy-efficiency.
7. Purchased pulp-based paper mills consume modest amounts of energy, but have low energy-efficiency.
8. The production ratio between paper (virgin pulp-based) and paperboard (recovered paper-based) differs by region. Therefore, we need to develop benchmarks as appropriate.
9. Some countries specify the recovered paper utilization rate for certain paper products. (e.g. the Green Purchase Law in Japan)
10. Even in the same paper grade, basic weight and quality differ by region and product. The more lightweight paper consumes a large amount of energy.  
(e.g. Newsprint: 40, 43, 48, 51g/m<sup>2</sup>, Copy paper: 64, 80g/m<sup>2</sup>)

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## Conclusion

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1. JPA's Voluntary action plan has brought adequate results.
2. Inter-enterprise competition through information disclosure is considerably important because efforts against global warming brings cost reduction.
3. LCI works as a benchmark for time-series comparison of the progress of energy conservation.
4. Circumstances of energy and raw material significantly differ by country. Therefore, LCI doesn't work as a tool for international comparison.
5. ICFPA should set the basic position of the world paper industry including developing countries against global warming issues, and promote the acceleration of the industry's efforts against the issues.
6. For future efforts against global warming, it is preferable that each region develop the scheme like JPA's Voluntary Action Plan.

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Thank you very much