The Sustainable Business Model of a Comprehensive Biomass Enterprise

In addition to preventing global warming and protecting watersheds, forests perform a wide variety of functions such as providing shelter for diverse living creatures. As a comprehensive biomass enterprise, the Nippon Paper Group practices sustainable forest management, while also making full use of and recycling the precious resources forests represent.

Helping to fight global warming, protect biodiversity, and prevent resource depletion

1. Sustainable Forest Management

- **204,000 hectares** of company-owned forests worldwide—roughly equivalent to the entire area of Tokyo Prefecture
- After harvesting, steps are taken to regenerate forests. Every effort is being made to ensure that forests under our stewardship thrive indefinitely.

   **Preserving biodiversity**

   Nippon Paper Industries has designated approximately 20% of its Japanese forest as “environmental forest areas.” In these areas, logging for commercial purposes is prohibited and forest biodiversity and water resources are protected. These environmental forest areas include national park lands in Akan, Nikko, and other places as well.

   **Environmental forest areas:**

   - **18,000 hectares**
   - About 20% of forests owned in Japan

2. Carbon Neutrality (Preventing Global Warming through the Carbon Cycle)

   - **CO₂ sequestered in company-owned forests worldwide:** 34 million tons

   Trees, the principal raw material used by the Nippon Paper Group, absorb and hold CO₂ from the atmosphere as they grow. When wood resources are burned, this CO₂ is released, so there is no net increase in atmospheric CO₂. The ongoing effective use of wood resources from properly managed, sustainable forests constitutes a carbon-neutral cycle that adds no carbon to the atmosphere.

Nippon Paper Group Sustainability Report 2015
Making full use of and recycling trees as a biomass resource

Cascade use of trees

The Nippon Paper Group uses trees in a cascade of applications that contributes to greater resource usage efficiency by employing every bit of every tree.

Prevention of resource depletion

Of the energy used by the Nippon Paper Group, 47% is comprised of black liquor from the pulp-making process, wood construction waste and other biomass fuels, and fuels derived from discarded tires, RPF, and other waste materials. As well as using biomass fuel, the Group is making advances in the development of biomass materials that can be used in place of petrochemical products.

Non-fossil energy* as a percent of total energy usage: 47%

* Non-fossil energy = biomass energy + waste energy

Recycling of Paper Products

The Nippon Paper Group is working diligently to increase the waste paper collection rate with the support of customers and the general public. In addition to bolstering its recycled paper processing capabilities, the Group is striving to improve the quality of pulp made from recycled paper and to increase the number of applications.

Recycled paper utilization rate

| Paper | 38% |
| Paperboard | 92% |
Nippon Paper Group Business Overview

The Nippon Paper Group uses renewable wood resources to pursue a diversity of businesses. From paper and paperboard, and household paper, to paper containers, chemicals, and housing construction materials, we provide a wide range of products indispensable for daily life.

Pulp and Paper Business

Business Description
Various paper, paperboard and household paper products in this core segment lead the domestic industry in production, sales volumes and quality. We are working to reorganize our production structure. At the same time, we are proactively developing overseas markets for paper and paperboard, especially in Asia and the Pacific Rim. Significant attention is also being devoted to the application of in-house power generation know-how to produce and sell electricity.

Principal Customers
Newspaper, publishing, printing, and stationery companies; public offices, paper manufacturers, electric utilities, and general consumers
Paper-Related Business

Business Description
Comprising this business are three segments, including paper-processing operations, which add various forms of value to paper as a raw material; the chemical products segment, which applies all wood components fully in the manufacture and sale of various types of products; and the functional film segment, which makes the most of its clean coating technology.

Principal Customers
Manufacturers of beverages, food, chemicals and other products, and various types of paper processing companies

Wood Products and Construction Related Business

Business Description
The lumber segment of this business has the advantage of using Japanese timber obtained by the same expertise we use to procure wood resources for making paper. It also focuses on using construction materials made from Japanese wood resources. The civil-engineering-related segment makes use of the technologies we have amassed for maintaining facilities at our paper mills.

Principal Customers
Construction materials, housing and construction companies, general consumers, and public offices

Other Businesses

Business Description
Included here are segments that put biotechnology expertise developed in afforestation R&D to work in agricultural pursuits; apply real estate and other Group assets in sports and leisure operations; and handle product and material logistics for Group companies.

Principal Customers
Businesses and general consumers
Fifth Medium-Term Business Plan

The Nippon Paper Group has formulated its Fifth Medium-Term Business Plan, which covers the period April 1, 2015 to March 31, 2018. Working from a base of enhancing profitability in the domestic and overseas paper and paperboard businesses, this plan sets the course for expanding growth businesses by transforming the business structure, and creating new value as a comprehensive biomass enterprise shaping the future with trees.

Key Themes of the Fifth Medium-Term Business Plan

- Expansion of biomass power generation and other energy businesses
- Biomass fuels
- Expansion of high-value-added product sales
- Expansion of overseas sales
- Cellulose nanofiber
- Expansion of high-value-added product line (Packaging materials with barrier properties)
- Expansion of overseas sales
- Packaging for aging society
- Response to safety and hygiene awareness
- Application of paper manufacturing and coating technologies
- Expansion of light incontinence product sales
- Expansion of overseas sales

Sources of Growth

The Nippon Paper Group’s Wood Science Technologies

Nippon Paper Industries’ Global Biomass Resources

204,000 hectares in total
(Company-owned forests in Japan: 90,000 hectares
Overseas afforestation areas: 114,000 hectares)
1 Energy
Nippon Paper Industries began operating a solar power plant in the city of Komatsushima in Tokushima Prefecture, in February 2015, and a biomass power plant at its Yatsushiro Mill in June 2015. It is also advancing a coal-biomass mixed fuel power generation project, a wind power project, and a new initiative for the commercialization of biomass fuel. Moving forward with the steady implementation of the Fifth Medium-Term Business Plan, work will focus on rapidly developing these energy projects into businesses with combined annual sales of around 50 billion yen.

2 Healthcare
The healthcare business is viewed as a promising growth area and is being treated as a high priority for management resources, which will be allocated with the goal of achieving a medium-term target of ¥20 billion in annual sales. Nippon Paper Crecia will complete capacity expansion work at its main Kyoto Mill and simultaneously strengthen its sales operations. In addition, through the release of products such as the Poise® and the Hada Care Acty® series of light incontinence products featuring outstanding odor control, Nippon Paper Crecia is offering new value that responds to the needs of an aging society.

3 Packaging
Having gotten into the business of paper containers for liquids 50 years ago, we are now at a turning point and it is now time to refocus our attention on the development of original products. We aim to enhance the added value of our products from various perspectives, including the 3Rs (Reduce, Reuse, Recycle) and portability. Over the medium term, we will move forward with attention focused on expanding into paper container applications beyond beverages and developing business on a global scale.

New Business

Cellulose Nanofiber (CNF) - Using a Proprietary Technology to Create a New Market
Cellulose nanofiber is wood fiber (pulp) that has been refined down to a nano*-order scale and is the world’s most advanced biomass material.

In October 2013, Nippon Paper Industries established Japan’s first production demonstration facilities (with minimum production capacity of 30 tons per year) for CNF at the Iwakuni Mill. At present, we are distributing sample products to potential customers in a range of industries to support application development, while we work to establish the mass-production technology and reduce production costs.

Having developed healthcare products, such as the Hada Care Acty® series, which incorporates CNF in a functional sheet with outstanding odor-control properties, we are also developing new markets for products applying CNF.

Japan’s Ministry of Economy, Trade and Industry has established the goal of developing the CNF materials market into one with annual sales of a trillion yen by 2030. Given the potential to greatly reduce weight - for example, in automobile parts - CNF could give rise to a major new market in composite materials. Nippon Paper Industries, therefore, aims to allocate more human resources to the task of accelerating the commercialization of CNF.

* "Nano" = one billionth.
### Social Issues and the Nippon Paper Group’s Value Creation Flow

**Raw Materials Procurement**
- Forest certifications for company-owned forests inside and outside Japan: **100%**
- Overseas afforestation areas: **114,000 hectares**
- Company-owned forests in Japan: **90,000 hectares**

**Production and Shipping**
- Production facilities of principal operating companies (Japan: **43 sites**, Overseas: **4 sites**)
- Nippon Paper Industries Co., Ltd.* **89%**

* Pulp and paper operations

### Addressing Social Issues in Our Value Chain

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#### Raw Material Procurement
- **Sustainable procurement of raw materials** (Efforts to procure certified material, confirm legitimacy, pursue afforestation overseas, obtain certifications for company-owned forests, and use domestic materials)
- Protection and nurturing of company-owned forests in Japan (Preserving biodiversity and other efforts to maintain the diversity of roles played by forests)

#### Responsibility to Customers
- **Confirmation of suppliers’ actions in respecting human rights** (Conduct of an annual supplier survey)
- Respect for human rights in the company’s forest management (Respect for indigenous people, prohibitions against forced labor and child labor, etc.)

#### Responsibility to Communities
- **Coexistence with communities adjacent to overseas afforestation areas**
  - Job creation, education support, cultural preservation
  - Contributions to local environments: Preserving biodiversity, promotion of safety and disaster preparedness, etc.
  - Contributions that make use of company-owned forests for the benefit of local areas and communities
  - Environmental education that makes use of company-owned forests, etc.
• Nippon Paper Group’s Net Sales Breakdown
  - Pulp and Paper Business: 79.5%
  - Wood Products and Construction Related Business: 5.6%
  - Paper-Related Business: 8.6%
  - Other Businesses: 6.3%

- Climate change initiatives
  - Reduction of environmental impacts
    (Water and air pollutants, waste, noise, vibration, odor, chemical substances, etc.)
  - Development and manufacturing of environmentally and socially conscious products

- The stable supply of products
- Ensuring quality and safety
- Increase in load efficiency
  (Promotion of modal shifts)
- Shortening of transportation distances
  (Pursuit of direct delivery and reorganization of distribution warehouses)

- Providing environmentally and socially conscious products
  - Ensuring safety in use
  - Pursuing customer satisfaction
  - Appropriate disclosure of product information
  - Addressing customer questions and opinions

- Promotion of recycled paper usage
  (Strengthening of waste paper processing capacity, expansion of use of unutilized waste paper, improvement of recycled paper pulp quality)
  - Promotion of wastepaper collection

- Coexistence with areas surrounding mills
  (Job creation, education support, contributions to local environments, cultural preservation, promotion of safety and disaster prevention, etc.)

- Reduction of impacts of shipping
  (Promotion of transportation safety, adoption of low emission vehicles, promotion of noise abatement measures)

- Working with local communities to promote wastepaper collection

- Promotion of appropriate information disclosure and communication

MATERIALITY

Sales and Usage

- Nippon Paper Group Sustainability Report 2015
CSR Materiality at the Nippon Paper Group

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The Nippon Paper Group, working from a foundation of sustainable forest management, contributes to better living and cultural progress as a comprehensive biomass enterprise making full use of, and recycling, renewable wood resources.

We have a social responsibility to use renewable resources to contribute to the development of a sustainable society. Proper management can make forests into sustainable resources and enable the preservation of forest ecosystems and biodiversity. Sequestering CO₂ in forests and using wood resources helps to fight global warming. And using, recycling, and regenerating wood resources prevent resource depletion.

Creating new products and expanding our activities as a comprehensive biomass enterprise, the Nippon Paper Group manages and operates expansive forests and large-scale production sites, and has a significant impact on the local areas and people who work there. Coexistence with these communities, as well as reducing environmental impacts and securing the safety and health of our local employees, therefore, are critical to our own continued existence.

Moreover, the opinions of our stakeholders serve as valuable opportunities to grasp issues that are important for coexisting and growing with society in a sustainable way.

Therefore, the materiality items given above are of particular importance among our initiatives addressing social issues in our value chain (see pages 12–13). Materiality items, which were identified based on impact on stakeholders and importance to our businesses, also reflect Nippon Paper Group employee survey results, and concerns frequently expressed by customers and local communities in inquiries submitted to the Nippon Paper Group.