



Feature Article 1 | What is the Purchasing Environment Committee doing? Approach to CSR Purchasing

In the global business environment, CSR Purchasing has increasingly been emphasized. We at Subaru have started preparations to work out CSR Purchasing Guidelines by 2011. Here is a glimpse of our involvement in CSR Purchasing.

Purchasing Environment Committee in Action for Setting the Guidelines by 2011

The Purchasing Environment Committee comprising purchasing managers from business units of Automotive, Industrial Products, Eco Technologies and Aerospace is held twice a year. Its inception is intended to work closely in concert among the members in environmental area. They exchange information on their Environmental Management Systems (EMS) and promotions to reduce environmental impact. Starting this year, they began to tackle with the issue of CSR Purchasing.

At the meeting in late April, they had a meeting, inviting Ms. Mizue Unno as lecturer, the Manager Director of So-Tech Consulting Inc., to hear fundamentals such as objectives of CSR Purchasing and its necessity as well as case examples of other firms. After the presentation, the members presented their current status as follows.

Actions Unfolding under Global Purchasing Environment

Automotive Business Division

① Environment

- The existing Green Purchasing Guidelines to be reviewed for more eco-oriented approach in response to the recent legal and CSR developments.
- Subaru of Indiana Automotive, Inc. (SIA) which produces the Legacy and others in the U.S. will also employ Green Purchasing Guidelines anew employing the IMDS^{*1} data management with its suppliers.
- We are responding to reduce substances of concern under EU directives while coping with the revision of the ANNEX II^{*2}. This year, we started working to meet the REACH Regulation^{*3}.
- We are recommending our suppliers to establish EMS by acquiring the ISO 14001 certification or the Eco Action 21 as its alternative.

② Compliance

- We took part in formulating the Fair Trade Guidelines of the Automotive Industry, based on which has been put into practice with our suppliers.

③ Risk Management

- As part of CSR activities, we are studying risk management to brace for contingencies like earthquake jointly with local residents and administrative authorities.
- We are involved in risk management and health & safety-related activities based on the Occupational Health and Safety Management System.

^{*1} IMDS (International Material Data System): System to collect materials and contained substances of automotive parts totaling about 30,000. This system was developed to deal with EU directives which regulate substances of environmental concern in new cars, handling of used vehicles and recycling rates. This IMDS is used as the standard system in the automotive industries world-wide, and is also approved as an industrial standard by the Japan Automobiles Manufacturers Association (JAMA) to collect information on substances.

^{*2} ANNEX II: In this annex are described products and parts to which the RoHS Directive is not applied due to such reasons as scientifically unfeasible. Its contents are reviewed, in principle, once every two years.



The members exchanged their opinions on involvements in CSR Purchasing.

(Left) Ishihara, Chief General Manager of Purchasing Div.
(Right) Nakamura, General Manager of Purchasing Planning Dept.

System Improvement at Asian suppliers in Urgent Need

Industrial Products Company

- Preparations to establish EMS are under way at all the selected 102 suppliers, out of which 80 suppliers opt for the ISO 14001 certification, 3 for simplified EMS versions like Eco Action 21 and the other 19 for self-diagnosis report.
- Substances such as hexavalent chrome and lead have been worked on for their complete elimination and we are pressing on to meet the REACH Regulation this year.
- With an increasing number of Asian suppliers for direct business, green purchasing and establishing EMS are outstanding issues.

Supporting Acquisition of Eco Action 21 Certification Ongoing

Eco Technologies Company

- Because of most suppliers being small in size, our EMS management team goes on the beat to check actual situations at their production sites.
- Study meetings are being held to help suppliers secure the Eco Action 21 certification. From now, we are pushing on to get all the selected 40 suppliers granted with certifications.
- New European and Asian suppliers who began transactions with the inception of wind power generation business are working on for ISO 14001, but being in the first year of business, still in a preparatory stage.

Supplier Base Expanding for EMS Establishment

Aerospace Company

- 47 out of the selected 61 suppliers have completed in introducing EMS. They include 40 suppliers with ISO 14001 certification and 3 suppliers with Eco Action 21 while the remaining 4 approved based on their self-diagnosis reporting.
- Routine patrols are practiced cooperating with the Eco Technologies Company team located in the same premise.
- Hazardous substances had been checked for their reduction according to our own Green Purchasing Guidelines, and as a result, there was no subject substances found in FY2007.

Do Best at Each Business Unit

After hearing these presentations, Ms. Unno pointed out as follows: "I will give credit to what you give your suppliers a choice for establishing EMS including the Eco Acton 21 without limiting it to the ISO 14001 certification. However, although you are dealing with such items as health and safety, environment and corporate ethics all right within the ordinary management system, the labor management still is an issue. In CSR Purchasing, due care must be paid to issues related to the labor environment and human rights.

We recognize a lack of unity since handling issues differs from unit to unit due to the Company system. For example, while the automotive unit standardizes on the ISO 14001 certification, the Eco Action 21 or passing the self-diagnosis is the mainstream at some Companies. Regarding such inconsistency, Ms. Unno advised saying, "It is nothing unusual to have different approaches by business units. It will be better to keep flexibility rather than forcing unification by properly managing by their procedures. As the Industrial Products Company with a

growing business with Asian suppliers has to give priority to labor management, health and safety, each Company should do their best under given circumstances".

We cannot easily conclude on what is the best, but the presentations of current status and the exchange of views among the members from respective Companies undoubtedly allowed us to identify and share the issues to be addressed. We are now ready to step steadfastly toward making CSR Purchasing a reality.

*3 REACH Regulation: It is one of the efforts at regional level by the EU to systematically assess risks of many chemicals to the health and environment and to manage them properly.



Junichi Tezuka
General Manager,
"Customer-First" Promotion Dept.

Backup by Dealer Support Staff Ongoing from Identifying to Solving Problems

In May, 2007, a dealer support group was formed to improve customer handling to work with dealerships. Currently, 9 members routinely visit their assigned dealer facilities to identify problems in sales, technical services, customers reception and attending to their needs in a showroom. They come up with specific proposals for improvements and promote their implementation.

Listening to the president, officers and outlet managers of a dealership is one way to confirm, using a check sheet, if they are performing their duties according to the Subaru Operations Standard. In this way, we can visualize what the problems are.

Once the problems get isolated, then they work out remedies and redesign specific work flows by recombining jobs and other

means. Senior staff of the dealership are working hard, handing down their know-how and experiences over to their junior fellows. Respecting their approaches to their jobs, the team is pushing forward through fully discussing steps to be taken.

Beefing Up Response-to-Customers Capabilities with Two Themes in Mind

In the 2004 Japan Sales Satisfaction Index (SSI) Study by a third-party research agency, J.D. Power Asia Pacific, Inc., Subaru was ranked at the bottom in the industry. Taking this fact seriously, we came up with two themes to move up at least to the middle in the industry. All dealerships are now working across their organization in line with the themes.

The first is to put receiving customers 100% by all the dealer staff into practice. It may look simple, but when it comes to

Feature Article 2 | For Enhancement of Customer Satisfaction

Perspectives of "Customer-First" Promotion Department

In order to enhance customer satisfaction from global perspectives at all levels of the whole Subaru team, the "Customer-First" Promotion Department has been plowing ahead with activities with "Boosting Response-to-customers Capabilities at All Dealerships, Domestic and Overseas" as its theme. As a result, customer satisfaction has improved and dealers expectations on such activities have been on the rise.



Full-time Team Deploying Support Activities for Boosting Response-to-customers Capabilities



perfectly practicing it, it is a different story. Nevertheless, believing good first impressions smooth the way to next steps, each dealership has been putting this theme in action.

The second is to have weekly study meetings at sales outlets on an ongoing basis. We often come across with questions difficult to answer from knowledgeable customers. If salespeople are equipped with ample product knowledge and listening skills, they could identify what customers really are looking for to meet



Michitoshi Ichibanagi

Manager,
Global CS Promotion Sec.,
“Customer-First” Promotion Dept.

their expectations. This is behind the need to enhance their knowledge and skills for CS improvement. Explaining product functions, different features from competitors’, benefits customers can expect from certain functions and other such details requires clear understanding of these functions by salespeople themselves to make customers happy.

In this way, we always keep in mind the importance of communication with honed skills by greeting customers by all the dealer personnel.

As a result of such approaches, much progress has been achieved at many

dealerships (Refer to Page 11 for details of activities at TOKYO SUBARU Inc.). Our efforts has led to our position ranked 5th in the 2007 Japan Sales Satisfaction Index (SSI) Study^{*1} and 7th in the Japan Customer Services Index (CSI) Study^{*2} both by the J.D. Power Asia Pacific, Inc., which proves we have stepped out in the right direction.



Makoto Kimura

Section Manager,
Global CS Promotion Sec.,
“Customer-First” Promotion Dept.

[Objectives of the “Customer-First” Promotion Department]

To Enhance Response-to-Customers Capabilities and Customer Satisfaction as the Whole Subaru Team from Global Perspectives

Priority Issues for FY2007

- ① **Promotion and deep-setting of renovative CS-focused activities**
To step up responses to customers for mid-level position in the industry standing in the SSI-CSI Survey by the J.D. Power Asia Pacific, Inc.
- ② **Problem solution by all hands at outlets led by their leaders**
To revitalize outlets by helping them eliminate roadblocks
- ③ **Accumulation and sharing of successful know-how**
To streamline improvements and step up the level of response-to-customers-capabilities by sharing successful know-how among all the members of the Subaru team

Announcement of Expanding CS Activities to Overseas at “G8 Prime Overseas Distributors Meeting” with Major Exclusive Distributors Representing 8 Countries

In October, 2007, we made a presentation on CS enhancement at a meeting known as “G8 Prime Overseas Distributors Meeting” where representatives of Subaru distributors from 8 countries got together. Our belief that the basic concept of customer satisfaction is universally common prompted us to call on them to implement the same as we do in Japan.

Regarding rather new markets in China and Russia where demands grow rapidly, since our support in their responses to customers is not enough, we are studying to offer them translated versions of CS promotion tools used in Japan.

With the 17-year experience in CS improvements in Japan, we will map out overseas programs which are easy to follow.



Detailed Review of Shop Environment and Protection of Private Information

Environmental conservation also cannot be overlooked. The dealer support team checks shops with the 5S principles in mind for installation of equipment which separates engine oil from discharged water, its proper function, orderly stocking of lubricant and the like. It goes beyond an appearance issue since they are items required to comply with ordinances of municipalities. These are also to be covered by the “Customer-First” Promotion Department.

Meanwhile, in modern society where compliance violations, such as deceptions and data fabrications, occur one after another, proper business management is much called for. Amid such climate, the protection of customers’ privacy and proper management of private information are also areas to be followed for improvement.

Stepping Up toward CS No.1 in Each Territory

Territories of dealers have unique characteristics. Under a new approach for CS No.1 in their respective territories, we kicked off a “CS Area No.1 Strategy” in April, 2008.

In the past, emphasis had been placed on receiving customers at dealers for CS improvements. With the new medium-term management plan rolled out, our approach to CS is now shifted toward “Customers Come First.” Although cheerful greetings and observing proper manners are still part of CS activities, how much we could exceed customers’ expectations in day-to-day operations to impress them is becoming more important. This is exactly where the “Customer-First” Promotion Department comes in to play.

We are determined to build a system which encourages each employee to question inside “What we should do to practice customers-come-first?”, and then to get such mentality reform to sink in deep across the board taking time as needed.

*1 Source: The 2007 Japan Sales Satisfaction Index (SSI) StudySM by J.D. Power Asia Pacific, Inc. The 2007 study is based on the response from 5,444 new passenger car buyers (excl. mini cars) regarding how they are treated by dealers at the time of purchase.
*2 Source: The 2007 Japan Customer Service Index (CSI) StudySM by J.D. Power Asia Pacific, Inc. The 2007 study is based on the response from 5,359 passenger car owners (excl. mini cars) who had received after-sales services (maintenance, repairs, etc.)

From right: Mr. Osamu Yamashita, the shop manager of TOKYO SUBARU's Nakano Shop, Ms. Ryoko Nishimura, the CS member of the shop and Ms. Yoko Sugawara of the CS Promotion Section of TOKYO SUBARU



SUBARU



Feature Article 3 | Dealerships in Action

CS Frontline

~TOKYO SUBARU's Nakano Shop in Constant Evolution

Fuji Heavy Industries are pressing forward with dealerships nationwide to put thoroughly in practice the “Customers Come First” policy by sending staff from the “Customer-First” Promotion Department. Dealers also have been grappling with their unique issues identified out of their own discussions on what should be done.



There is no goal in CS Promotion Required Responses Spiral up with Mounting Customers' Expectations

What is the Shop-building to Attract Customers All About?

The Nakano shop of TOKYO SUBARU, Inc. facing the Mejiro Street, has the whole Nakano Ward as its sales territory and has welcomed many customers.

Mr. Osamu Yamashita transferred to work as a new shop manager in October, 2007 recalls the situations there when he first moved in, saying, “Today we often cannot see customers at their home since two-income families are on the rise and more people are out for leisure. This trend forced us to shift our sales efforts from door-to-door visits to attracting customers to the showrooms. However, when I first came here, the Nakano shop lacked cheerful atmosphere. Probably for that, many customers leave the shop soon after they arranged their cars for inspection, saying that they would come back later for the cars. As seen from this example, the issue was how to set up and run the shop to make them feel like staying longer and visiting us often by welcoming customers wholeheartedly.”

He pointed out two points for improve-

ments.

The first is the hard side of running a shop. He felt acute need to remodel the showroom.

His shop was designated by FHI as a “Model Shop” in commemorating the Subaru's 50th Anniversary”, which allowed them to complete an upbeat and beautiful showroom as you see today. The service shop was made glass-walled for customers to see their cars in service, and couches were placed for mothers to relax by the side of a kid corner, for example, thus converting the whole facilities into space for heartfelt reception with care paid to minute details here and there.

The other point is the soft side or the mindset of the staff. They had monthly “CS Scrum” meetings for one-and-half years before I came. They were intended to have employees identify issues by themselves

and find ways for solution. But, their efforts had led to little improvement contrary to their expectation. Ms. Ryoko Nishimura, the CS member of the shop, recalls, saying; “We have more or less has a system for one-on-one meetings with customers, but there was not an atmosphere to welcome them as the whole shop. For instance, we used to find customers looking around no knowing where to park their cars, showing a lack of due care by the staff.

We took up the issue repeatedly at the CS Scrum meetings for better customer handling, but not much lively exchanges of views among members with little execution of what had been agreed, though.

As often pointed out, what counts most is that all participants have a sense of stakeholder. Making this sink in their mind needs to have views of all the members



Parking lot colored for easy location identification



Glass-walled for customers to see services on their cars



Kid corner where parents and children can relax

reflected in the decision. But, voices hardly came from those who would feel awkward in speaking out before others or had little sense of participation. This is what the chief and CS members of the shop felt torn between."

Then, Ms. Nishimura took part in a facilitation study*1 hosted by the TOKYO SUBARU's CS Promotion Section for CS Committee members who serve as moderators of the Scrum meetings. She learned that a moderator can make participants feel easy to present their views at a meeting and put her findings in practice. Ms. Nishimura beamed, saying, "The members can now exchange briskly opinions in a relaxed manner. Everybody is beginning to feel convinced that such frame of mind to put what we decided in practice would lead to our positive day-to-day behaviors. In a sense, revitalization of the Nakano shop has just begun."



Reenergized Mindset Bearing Fruit, but No End in Evolution

"Welcome to SUBARU!"

Cheerful greetings as usual reach customers' ear whenever they open a door. This is what we call "Welcome Beam" cited by TOKYO SUBARU as one of their CS upgrade measures. Of course, when customers leave their premise, "Thank You Beam" is ejected this time to express appreciation.

Meanwhile, in the parking lot marked off by different colors, customers can park their cars at ease. Sales personnel are always ready to jump out whenever some help is needed.

"Our people looked perplexed at first, even one word of greetings not coming out nor taking minds off their job at hand to welcome. It was my role, taking opportunities, to make them understand why every one of us had to get involved." Mr. Yamashita recalls.

With regards to grasping product knowledge which is indispensable in sales, all outlets of TOKYO SUBARU encourage their sales people to participate actively in their weekly sales study meetings. When they had new

models coming out, they opened ad-hoc study meetings with all the members across the board, all of which contributed to maintaining high levels of expertise.

"Both the hard and soft sides have improved a lot", Ms. Yoko Sugawara of the CS Promotion Section of TOKYO SUBARU assesses the reborn Nakano shop this way. She continues, "My impression about the staff of the Nakano shop is rather positive overall from the beginning since they make us feel at home and friendly among themselves. Each staff must have come to grips with what he/she has to do, becoming confident and ready to take responsibilities. Reinforced hardware plus above all the reenergized mindset make them assured in receiving customers, which I believe are producing tangible CS effects. We can foresee brighter future at the Nakano shop."

"There still are a lot to be done," adds Mr. Yamashita. He concluded by saying "One step higher the CS level gets, one step higher the customers' expectations get, We've got to keep CS activities spiraling upward, and for that I count a lot on my staff to show their stuff."

The word, diversification of needs, has been around for quite some time. The automotive industry perhaps is the one mostly tossed about by the waves it created. In the past, youths used to view driving cars around as a big status symbol, but today our rivals are not limited to ones in the same line of business. Others have come on the scene with all types of portable phones and personal computers vying for getting customers' attention.

Under such circumstance, the CS is a vital concept to have not only new Subaru customers, but also those valued patrons deepen their affection to Subaru and feel like owning another one. To see this happen, here at TOKYO SUBARU, we developed 3 CS objectives and 7 action programs. 2 CS members were selected from each outlet, and they worked out a new system to address various issues with their chief in cooperation with the CS Promotion Section of Business Support Department at the head office.

However, what is the important is the frame of mind. Our sales shops are the first contact for customers who have agreed with competitiveness of Subaru products and the corporate image. Staff and shop personnel who welcome them should never stand in the way, deflating their expectations. For that reason, the staff members at each outlet are required to firmly grasp what they should do from customers' points of view.

They are absorbing many things to elevate their motivations through guidance by the dealer support group of Fuji Heavy Industries, CS Scrum meetings to discuss their own problems and sales study meetings where they learn new product knowledge.

There is no goal in the quest for customer satisfaction. We are working hard to pull up our CS to a leading level not only in the Subaru group, but also in the automotive industry.

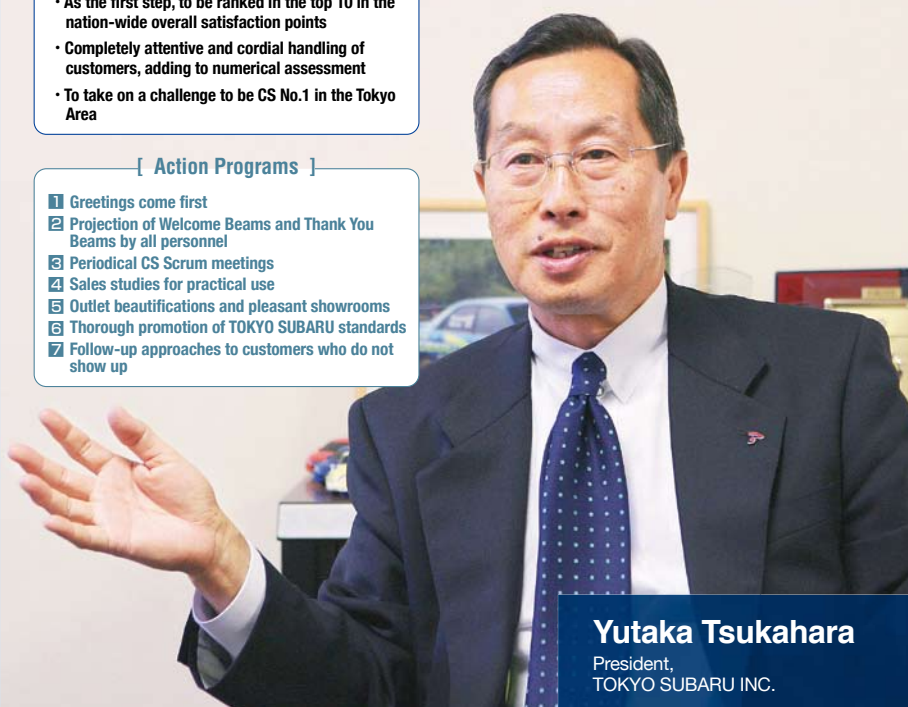
CS Hinges on How We Can Respond to Largely Diversified Customers' Needs

[The CS Objectives]

- As the first step, to be ranked in the top 10 in the nation-wide overall satisfaction points
- Completely attentive and cordial handling of customers, adding to numerical assessment
- To take on a challenge to be CS No.1 in the Tokyo Area

[Action Programs]

- 1 Greetings come first
- 2 Projection of Welcome Beams and Thank You Beams by all personnel
- 3 Periodical CS Scrum meetings
- 4 Sales studies for practical use
- 5 Outlet beautifications and pleasant showrooms
- 6 Thorough promotion of TOKYO SUBARU standards
- 7 Follow-up approaches to customers who do not show up



Yutaka Tsukahara
President,
TOKYO SUBARU INC.

*1 Facilitation: A method to reinvigorate a group or organization by guiding to build mutual understanding and consensus at meetings.



Functions for Peace of Mind and Safety Also Upgraded

Subaru has so far focused on the concept of “active safety (preventative safety)” and worked on its embodiment. The New Foresters have the VDC¹ as standard equipment across the board. This device functions to prevent side slip of a vehicle when its behavior has come close to the driver’s control limit by regulating the engine output and braking. The ABS², Brake Assist and Hill Start Assist³ are also provided. Taking the good visibility over from the preceding models, the body configuration was further refined to allow the driver to see the four corners of the car body and the immediate rear view, all of which contribute to enhancing safety.

Regarding the safety in case of impact or the so-called “passive safety”, the new ring-shaped reinforcement frame structure, a Subaru’s traditional technology, was further evolved for more impact energy absorption. The engine hood structure also reviewed for protection of pedestrians, showed a protection performance level of 4 on the J-NCAP⁴ scale in in-house confirmation tests.

A New Car Which Makes Drivers Care for “Ecology” While Enjoying “Pleasant Drives” was Born



Feature Article 4 | Car Making Gentle to the Earth

Environmental Performance of the NEW FORESTER

The development theme of the New Forester which debuted as the third generation model in late 2007 was “Space, Running and Environmental Performance.” Among them, the environmental performance was pursued with two targets: significant “Improvement of Fuel Economy” and “Clean-up of Emissions.” Good 10 years have passed since the first Forester was born.

We will introduce specific features of the car, the purpose and process of its development, just the right subject for this memorial year.

In Pursuit of Car Also Picked for “Ecology”



Kazuharu Ichikawa

General Manager,
Subaru Product & Portfolio Planning Div.

With the surging consciousness of ecology world-wide, people has increasingly been critical of the environmental performance of vehicles. Under such circumstances, even powerful SUVs with massive look cannot overlook the environmental performance, due to their large population out there. So, we embarked on research and development with a goal to raise the environmental performance to a level high enough for potential customers to think about the Forester also from an ecological perspective, while capitalizing on charms unique to SUV.

What counts most in dealing with fuel consumption and exhaust emissions is the engine. The body of the New Forester is size larger than its predecessor, simply put, creating higher burdens on the environment in fuel consumption and emissions. Drastic measures were taken beyond merely offsetting the resultant negative effects to reduce pertinent figures.

Although the base engine is the “EJ20”, the same type used for the Legacy,

components were mostly redesigned.

The most significant contribution to improving fuel economy is the employment of an electric power steering system⁵ on models with a naturally aspirated (NA) engine, the first of its kind for the Subaru’s non-mini lineup. In its development, much attention had been paid not to sacrifice good driving characteristics of Subaru, or to create a steering feel equivalent to that of hydraulic power steering. The electric power steering improved the 10-mode fuel consumption by about 2% with the steering feel refined to quite a satisfactory level. Such “combination of pleasurable driving with the gloval environment” is also in line with the New Medium-term Management Plan.

We went all the way out to shave weights off the body and reduce the rolling resistance of tires as well as frictions in the power train system. These efforts led to a fuel economy of 13.8 km/l for a NA model and 13.0 km/l for a turbo model, which is respectably among the best in the class. We also worked out a catalyst layout to win a 4-star assessment in exhaust emissions performance.



Hiroyuki Ooiwa

1st Chassis System Design Sec.,
Chassis Design Dept.,
Subaru Engineering Div.

Electric Power Steering System Superior to Hydraulic Type in Fuel Consumption and Steering Feel Has Been Developed.

For both “improved fuel economy” and “Subaru’s driving performance”, we introduced an electric power steering system on the New Forester first for the Subaru’s non-mini models. Taking an advantage of its advanced development, we worked together with Vehicle Research & Experiment Division to run test vehicles all the way out with a goal to excel in steering feel over the existing hydraulic system without compromising the “Subaru’s driving performance.” I concentrated on tuning jobs with a laptop computer in the passenger seat. Even a slight difference in current by 0.1 A would result in a different steering feel. We made adjustments repeatedly until we felt confident about exceeding the hydraulic system. After all, the travel distance reached 1,000 km in three days. We felt that our efforts were paid off when usually critical journalists gave us high marks at the test ride event of the new-car release exhibition, saying “better than the hydraulic, isn’t it?”

Aerodynamics

Aerodynamic characteristics affect particularly high-speed performance. The Cd value 0.36* for the New Forester which is relatively high for SUV models is conducive to improvement in fuel economy, quietness and running stability. (*excl. some models)

Lightweight Body

Attention to details for structural optimization, ample use of high-tensile steel sheets and other means controlled the weight increase to 30 kg as against 70 to 80 kg normally expected for additional safety and other equipment.



Drive-line

Grass-roots reviews to reduce friction of bearings and other parts, brake drags and rolling resistance of tires have resulted in improvement of the fuel economy.

SI-DRIVE (Turbo models)

The three modes provided are selectable with a flick of a switch to allow drivers to run as they like. This feature gives a feeling as if you have three different types of engine. The most fuel-efficient intelligent mode is suitable to driving on city streets and cruising on expressways, for example, thus allowing eco-friendly driving almost at any time.

New Environment-friendly DOHC Engine



Toyohide Sunaguchi

Manager,
1st Power Unit Research & Experiment Dept.,
Subaru Engineering Div.



Both NA and Turbo Engines Far Tuned Up

We converted the naturally aspirated (NA) engine from SOHC to DOHC for low fuel consumption and emissions as well as for higher torque. The base engine is the type mounted on the Legacy which develops high output at high rpm with high octane gas. For the New Forester, we redesigned most of the components to make its engine produce high torque at low rpm with regular gasoline for ease of drive as SUV. This is the same for the turbo model with its engine components mostly renewed for high torque at low rpm to ease handling. The engine and transmission control units were also carefully tuned. Frankly, it was a rough going because the targets were so challengingly high. The development was a race against time. Nonetheless, the company-wide concerted efforts including production people made it possible to achieve the target figures within the original development schedule.

Vehicles as “Tools to Make People Think about Earth’s Environment”

With regards to the issue of deteriorating global warming, we will naturally play our part to improve fuel economy from the aspect of hardware, but also expect drivers to be always conscious of the environment whenever they sit behind the wheel through the communication with their cars. Out of such expectation, we installed an average fuel consumption meter on all the models and the Info-Eco Mode*6 on the AT models. With the help of

these features, drivers can step on the gas pedal in an earth-friendly manner through communicating with their cars.

These visible environmental items have a built-in message which calls on drivers to “communicate with us Subaru to think together about environmental issues through the cars.” The other passengers will also be subtly reminded of giving care to the environment. There is nothing happier than seeing more people becoming

ecologically-conscious in their day-to-day living through their encounters with the New Foresters.

Naoyoshi Morita

Manager,
Subaru Product & Portfolio
Planning Div.



*1 VDC: Vehicle Dynamics Control: It is the system to control unstable behaviors of a vehicle such as skidding.
*2 ABS: Anti-lock Braking System: It is the system to extract the maximum grip of tires by preventing their locks in braking.
*3 Hill Start Assist: It holds the braking force for about a second when one’s foot is taken off the brake pedal in starting on a hill, enabling smooth slope startup.
*4 J-NCAP: A car assessment program. Vehicles marketed by manufacturers are crash-tested under the same conditions, of which results are released to the public.
*5 electric power steering system: It is a mechanism to assist steering operations with the help of a motor. It gives better fuel economy since no engine-output consuming oil pump is needed as conventional hydraulic steering system.
*6 Info-ECO Mode: It is an AT mode which improves fuel economy through various controls. The Eco-lamp comes on when driving in a fuel efficient condition.

Feature Article 5 | Subaru's Approaches to Prevention of Global Warming Efforts in Product Development

Global warming, CO2 reduction, natural environment, etc.

There is no day passing without seeing these words in the mass media and on the internet. These have become matters of most serious concerns world-wide.

We now view the development and success of civilizations and cultures all realized through our own efforts, but in fact, we might simply have the ensuing happiness traded off with beautiful natural environments.

Today, Subaru has been tackling the global warming prevention issue at every stage of our activities from product planning, production to logistics to recapture such lost natural environments.

Next follow some examples of our approaches.

Much-expected Large-scale Wind Turbine System

Background of the Development of Large-scale Wind Turbine System

When global reduction of greenhouse effect gases is called for, Japan with most of its energy resources relying on imports must take initiatives in creating a low carbon society. What matters here is the wide-spread use of renewable natural energies, the most typical example of which is wind turbine system.

However, there are many issues in expanding the use of wind turbine system: unstable generation due to constantly changing wind, harsh natural phenomena unique to Japan including typhoons, lightning strikes and earthquakes, impacts on scenic beauties, noises, protection of birds, etc. Development of Japan-specific large-scale wind turbine systems or windmills had been much waited for efficient and stable power generation.

Doing Good to Global Environment by Venturing into Technological Innovation

To address these issues, Subaru which had accumulated experiences with small-to-mid-sized wind turbines, took on challenges in 2003 for the development of the "SUBARU80/2.0 Wind Turbine System" with an output of 2000 kW, the highest in Japan at that time. Fumbling our way out of difficulties, we finally succeeded in 2005 in installing a prototype which is character-

Characteristics of Our Large-scale Wind Turbine System and Its Advantages over Competing Products

1. Adoption of downwind rotor

The downwind method which directs rotor downwind was adopted as suited to Japan's topography. In general, the rotor is directed upwind, but the downwind type absorbs wind power efficiently with wind off topographical configurations like mountains and hills.

2. Reinforcement of lightning protection

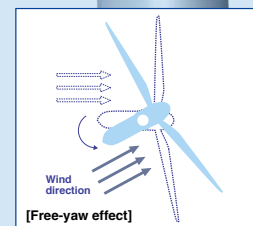
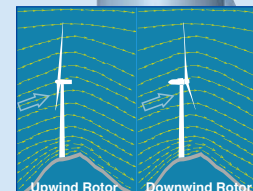
A lightning protection which exceeds the world standard is set as a standard feature by making the system strong enough against powerful lightning hardly seen outside Japan.

3. Safety device (Free-yaw effect)

A downwind turbine has the free-yaw effect which works to direct the rotor downwind naturally like a case of weathercock. When hit by storms, it can pass off wind naturally, and safety is assured in case of temporary blackout.

4. Easy installation

The nacelle can be disassembled and reassembled with smaller cranes and other equipment. The blades can be assembled onto the nacelle in the air, allowing their assembly when the land space is limited.



ized by the downwind rotor unique for large wind turbines. Then, the first production model was delivered in 2007, opening a new history of Subaru wind turbine system.

To make effective use of limited land space as in the case of Japan, technologies for larger wind turbines and use of ocean for optimal installation are much expected.

Subaru will keep tackling challenges for technological innovation to help solving the issue of global warming through wind turbine system.

Characteristic Engines Unprecedented in the World

Improvement of automotive fuel economy is strongly voiced world-wide as a measure against global warming. Particularly in Europe, where powerful running with good fuel economy is in demand, more than half of the passenger cars sold are of diesel type.

Subaru developed the world-first boxer-type diesel engine for passenger cars with significantly reduced CO₂ emission and improved fuel economy. The characteristics of the combined boxer engine^{*1} and symmetrical AWD, both Subaru's core technologies, were further uplifted, providing customers with Subaru-unique exhilarating driving and environmental technology.

In March, 2008, the Legacy and Outback equipped with this engine were put in the market.

Subaru's Driving Performance Distinct from the Pack of Existing Models

We pushed forward with the development on our own by fusing expertise fostered with boxer gasoline engines and many latest technologies without any model example. Despite many difficulties, we completed the development rather in a short time so that customers could taste as soon as possible the advantages of the combined boxer diesel engine and symmetrical AWD, the driving feel which is distinct from that of other diesel engines.

The horizontally opposed engine distinctively features an extremely low level of vibration by reciprocating pistons for a mechanical reason, which led to the elimination of balance shafts found on most of diesel engines in the same class to offset vibration. This feature eventually enabled a compact, lightweight and responsive engine with low friction resistance and fuel consumption,

excelling in both environmental performance and fun-to-drive.

The CO₂ emission of 148 g/km of the AWD Sedan represents a top fuel economy in the class. Subaru cars with the boxer diesel engine are highly evaluated in the European market where diesel-powered models have a high market share.



Boxer Diesel Engine for Passenger Cars

Travel Distance Nearly Doubled over Conventional Electric Vehicles

Prosperous future for automobiles depends on converting them into vehicles with minimum impacts to the global environment by wasting no fossil fuel and reducing CO₂ and other emissions.

Subaru thinks that ideal vehicles use as their power source electricity by wind power generation or other means which rely on renewable natural energy, coupled with regeneration system to retrieve the

running energy in deceleration as electric power.

Subaru started developing hybrid and other types of vehicles from the mid-1990s by trial and error.

However, with the remarkable progress in lithium ion cell technologies as a turning point, we redirected our efforts toward the development of electric vehicles (EV) expectedly with simpler and highly efficient system without an engine.

As a result, the R1e, an electric car which far outperforms comparable gasoline-powered cars in efficiency, was born.

running.

It can easily be charged by simply plugging into an outlet at home, and 80% charging is possible in 15 minutes if a quick charger is used. The running cost of this handy model also is much lower than that of gasoline cars in general.

Verification tests of 40 R1e models started on public roads jointly with Tokyo Electric Power Co., Inc. in June, 2006. Since September, 2007, joint verification tests have been in progress with Kanagawa Prefectural Government. Out of these valuable data from such tests are emerging an electric vehicle which is easy and pleasant to use.

Subaru will keep working for higher performance, matching with charging stations and road environment and cost optimization to realize a prosperous future with automobiles and a society where electric vehicles are part of our life.

Concept in Developing Electric Vehicles



Testing on Public Roads in Progress

The R1e is a car gentle to the urban environment for its extremely low noise level without emitting CO₂ while



*1 boxer engine: The nickname of horizontally-opposed engine

Various Approaches by Subaru Group

Introduced here are some approaches implemented in FY2007 to prevent global warming by the Subaru group including affiliates.

Efforts at the Production Stage

An additional natural gas cogeneration system was introduced at the Yajima Plant of the Gunma Manufacturing Division

In June 2007, an additional natural gas cogeneration system was introduced at the Yajima Plant of the Gunma Manufacturing Division.

With this system, we expect to reduce CO₂ emissions by approximately 8,000 tons and energy use by the equivalent of approximately 1,800 kl of crude oil per year.



In 2002, a natural gas cogeneration system was already introduced at the Yajima Plant and that leads to the reduction of CO₂ emissions by approximately 29% compared to 1990 with the newly introduced system.

We have five natural gas cogeneration systems in operation in total; besides two at the Yajima Plant, two at the Oizumi Plant of the Gunma Manufacturing Division and one at the Main Plant of Utsunomiya Manufacturing Division.

Reduction of Substitute CFC (HFC134a) Emitted to the Air

To reduce atmospheric emissions of HFC134a used as a refrigerant from the vehicle manufacturing line at Gunma Manufacturing Division, we have continued effort to minimize leakage while pumping and recovering gas in car air conditioner. As a result, we have succeeded to reduce emissions by over 95% compared to FY1996 levels since FY2003 and achieved a reduction of 97% in FY2007 following FY2006.

Also, we are studying substitute refrigerants which have less greenhouse effect.

Global Warming Prevention Subcommittee

We have the Global Warming Prevention Subcommittee which promotes activities to prevent global warming at the production stage as a subordinate body of the CSR and Environmental Committee^{*1}. This subcommittee has secretariats at each division and Company to promote global warming prevention in day-to-day production operations. The members meet once every three months for information sharing.

The amount of CO₂ emission was reduced in FY2007 by about 9,000 tons over FY2006.

We will keep striving to reduce CO₂ emission and to save energy by accelerating steps to improve work processes.



Other efforts at production stage by the Subaru group

- ◇ Temperature optimization in paint booths
- ◇ Stoppage of electric power transmission during holidays
- ◇ Improvement of logistics inside plants
- ◇ Reduction of working on holidays
- ◇ Heat insulation of buildings
- ◇ Heat insulating paint application to roofs
- ◇ Installation of watt-hour meters
- ◇ Switching boiler fuel from heavy oil to natural gas
- ◇ Adoption of inverter-type compressors
- ◇ Use of natural gas for heating
- ◇ Prevention of air leaks in piping
- ◇ Circulation of coolant to reduce water drawing
- ◇ Power factor improvement of transformer stations
- ◇ Employment of high-efficiency fluorescent bulbs for lighting

Company Office Activities

Employment of LED for SUBARU Rooftop Ad Tower of the Head Office Building

◇The Subaru ad tower mounted on the rooftop of the SUBARU Building in Shinjuku, Tokyo, had its neon tubes replaced with LED for illumination. It is expected to reduce CO₂ by 18 tons per year in addition to energy saving.



◇SCI (Subaru Canada, Inc.) has been saving energy through the use of a highly energy-efficient sign since 1988. Its affiliate, SOMI (Subaru of Mississauga) changed the illumination source of the SUBARU signs to LED in September, 2007 for energy saving and CO₂ reduction cutting the electric power usage by at least 40% .



Other measures taken in offices of the Subaru group

- ◇ Application of heat-absorbing films to window panes
- ◇ Strict control of air conditioning temperature settings
- ◇ Installation of body-sensitive switching of lights in stairs and passages
- ◇ Promotion of eco-friendly activities in offices
- ◇ Turning off of unnecessary lights
- ◇ Automatic vending machines shut down at night

Efforts at the Logistics Stage

Next follow some steps taken in domestic transportation of completed Subaru vehicles, which accounts for about 60% of the group's whole logistics volume.

Modal Shift

Subaru vehicles are sent from its assembly plants in Gunma Prefecture to dealers nation-wide. As for the transports to Sendai and to the north as well as to Osaka and to the west, sea transports emitting less CO₂ as compared with trucking are used. The sea shipments accounted for 43.2%^{*2} of the total domestic transportation of completed vehicles in FY2007.



Cooperative Transports

We are proceeding with cooperative transportation with other companies in the same trade by shipping each other's vehicles on returning car carriers to minimize unloaded returns. In FY2007, the cooperative transport volume or the total of consigned-to and consigned-from vehicles reached 40,678 units.

The Result of Our Efforts

With these efforts we are promoting the reduction of energy consumption and CO₂ emissions at logistics.

FHI's Company-wide Energy Used per Sales and CO₂ Emissions at Logistics

FY	Energy used per sales (crude oil equivalent k/1 million yen)	CO ₂ Emissions
FY2006 (base year)	0.00972	24,900
FY2007	0.00843	22,800
Compared to previous year	86.7%	91.6%

Other steps taken in logistics by the Subaru group

- ◇ Optimization of shipping routes
- ◇ Improvement of load efficiencies
- ◇ Installation of highly functional digital tachograph on trucks
- ◇ Lecture classes on eco-driving
- ◇ Cooperative use of sea containers with other companies
- ◇ Transportation method for some loads switched from air to land

*1 CSR and Environmental Committee ▶ See p. 36

*2 Number of units shipped out of the plant gates, excluding units for export