TQEM@STMicroelectronics

The world is priceless;
ecology is free

Corporate Environmental Report
1998

THE EUROPEAN QUALITY
A W A R D
WINNER '97

MESSAGE FROM THE PRESIDENT AND CHIEF EXECUTIVE OFFICER

Corporate responsibility for the environment has evolved slowly and cautiously over many years. At first, companies believed that they were solely accountable to their owners or shareholders, but gradually they came to recognize their obligations to customers, employees and business partners. Today they also recognize that they have additional responsibilities towards the community at large.

This greater awareness of company responsibilities means that it is now more appropriate to talk of a "triple bottom line" in which companies focus on economic prosperity, environmental quality and social justice. The reason is simple: to ignore any one of these three is to jeopardize a company's success in the other areas.

Technological and scientific progress has made our era an exciting one, yet one that is fraught with dangers for the environment. The real challenge is to bring together the greatest talents in science, business and government to create the opportunity for everyone to improve their well-being and prosperity without putting the environment upon which we depend at risk.

STMicroelectronics embarked on its journey towards environmental excellence several years ago and we have now entered Phase Four of our march towards sustainable development. Our goal is to come as

close as possible to environmental neutrality, and we firmly believe that this goal is part of achieving above average business performance in our industry.

In June 1987 two unprofitable corporations merged to form SGS-THOMSON, today STMicroelectronics. The aim of the merger was to achieve the scale needed to succeed in the semiconductor industry. Hence, from 1987 to 1992 we focused on creating a healthy and competitive corporation - Phase One of our journey. During this phase our environmental efforts were limited to complying with local regulations.

In 1993 we moved into Phase Two, or "Compliance Plus". We established a corporate environmental group, began researching and collecting data and moved towards applying the strictest regulations of any site at which we operate to all of our sites worldwide.

By 1995 we had gained enough knowledge to move into Phase Three, which we called "Proactivity". We held our first Corporate Environmental Day, published our Environmental Decalogue and began our drive towards EMAS and ISO14001 qualification for all our manufacturing sites.

At the end of 1997, we launched Phase Four, "Proactivity Plus". We have established a good internal database, completed many successful pilot

projects, made excellent progress against our Decalogue goals and all of our manufacturing sites worldwide are qualified to both EMAS Regulation and ISO14001 Standard. We have demonstrated the validity of our conviction that sustainable development is also sound business practice and indeed increases competitiveness. In Phase Four we wish to take this message to a larger audience, encouraging businesses everywhere to strive for sustainability.

In this introduction to our first Corporate Environmental Report I wish to convey one message in the strongest terms. Much has been written, especially in the United States, about the economic devastation that will be caused by the Kyoto Agreement. Some American economists have run models, based on demonstrably unsound economic assumptions, and have outlined a disaster scenario which has been loudly publicized by the so-called "carbon lobby". Yet nothing could be further from the truth than their gloomy message of job losses, declining competitiveness and environmental costs consuming large proportions of global GDP.

On the contrary, our experience shows that sustainability does not require sacrifice or deprivation. Rather it means exploiting the latest technologies, reducing waste, reusing resources, adopting lean production and better logistics practices and making sound investments in efficient productive capacity. In fact, sustainability is not only free, for a market leader it is actually better than free because it provides a real competitive advantage.

As I have said before, those corporate leaders who still deny environmental sustainability are not only fighting a war of the past but are also demonstrating both industrial and social irresponsibility. Rather than bemoaning the mythical ruinous effects of sustainability, they should be leading their people in demonstrating the benefits of environmental responsibility to their companies, their nations and the world. Unfortunately, their failure to do so may well lead to the disasters they predict.

STMicroelectronics, in the meantime, will remain at the leading edge, demonstrating every day that sustainability is also good business and "doing well by doing good".

Pasquale Pistorio
President and Chief Executive Officer

STMicroelectronics AT A GLANCE

STMicroelectronics is a global, independent semiconductor company which designs, develops, manufactures and markets a broad range of integrated circuits and discrete devices for a wide variety of microelectronics applications including telecommunications and computer systems, consumer equipment, automotive products, industrial automation and control systems.

Created in June 1987 as the result of the merger of Thomson Semiconducteurs of France and SGS Microelettronica of Italy, the group today has 17 manufacturing sites around the world and approximately 28,000 employees. Corporate headquarters are in Saint Genis, France.

With 60 sales offices in 24 countries, STMicroelectronics offers more than 3,000 types of products to over 1,500 customers. ST serves customers in a wide variety of markets worldwide, including North America, Europe, Asia/Pacific and Japan. STMicroelectronics'common stock is listed on the New York Stock Exchange and the Bourse de Paris. It is also quoted on SEAQ International.

With nine research and development sites and 31 design and application centers, STMicroelectronics also possesses an extensive portfolio of intellectual property which includes in excess of 12,000 patents - both issued and pending - covering over 4,000 inventions.

ST champions quality and environmental initiatives. In 1997 the Company received the prestigious European Quality Award for Business Excellence, which is given to the best-managed company in terms of Total Quality Management principles.

For further details on STMicroelectronics please refer to our web-site: http://www.st.com

▶ US$4.02 Billion of revenues in 1997
▶ 28,000 employees
▶ 17 manufacturing sites
▶ 9 advanced R&D sites
▶ 31 design and application centers
▶ 60 sales offices in 24 countries
▶ Over 12,000 patents issued and pending covering over 4,000 inventions

MESSAGE FROM THE CORPORATE DIRECTOR, ENVIRONMENT STRATEGIES AND INTERNATIONAL QUALITY PROGRAMS

The need for the business community to reach out to both internal and external stakeholders in developing, implementing and improving sustainable economic programs is now increasingly recognized as a key corporate mission. At the same time, there is also a closely linked trend to develop environmental management systems following regulations such as the Eco-Management and Auditing Scheme (EMAS) or international standards such as ISO 14001.

In 1993, STMicroelectronics chose EMAS, the most demanding, as the framework within which to define its Environmental Policy. Our ultimate goal is to come as close as possible to environmental neutrality. In other words, to eliminate or minimize the impact of our products and processes on the environment, maximize the use of recyclable or reusable materials and adopt, as far as possible, renewable sources of energy as we strive for sustainable development. This choice has allowed us to obtain in addition to the EMAS validation also the ISO 14001 certification of all our 17 manufacturing sites.

In practice, we have set ourselves a number of simple and concise rules with associated goals and time scales – together they make up our Environmental Decalogue. Our goals are driven by a Total Quality Management approach and are therefore specific, measurable, and achievable. The use of the term "Decalogue" has been chosen to indicate the degree of importance we give to these objectives – in a sense, they are our "ten commandments".

One of the characterizing points of EMAS is communication to the public by publishing a validated Environmental Statement. All seventeen of our sites, located across four continents, have published such statements. In this report, we wish to communicate our cumulative corporate position and progress across our seventeen manufacturing sites worldwide.

Fabio R. Borri
Corporate Director, Environment Strategies & International Quality Programs

SUSTAINABILITY AT STMicroelectronics - GENERAL CONSIDERATIONS

Care for the environment is a core element of the way STMicroelectronics conducts its business and is embodied in our environmental vision, mission and policy.

Our environmental vision
To be recognized by all our stakeholders as a leader in environmental care by following our Environmental Decalogue and by exceeding regulatory requirements in both degree and timing wherever possible. As a reflection of this commitment, to acquire Eco-Management and Audit Scheme (EMAS) validation or equivalent in all the communities in which we operate.

Our environmental mission
To eliminate or minimize the impact of our processes and products on the environment, maximizing the use of recyclable or reusable materials and adopting, as far as possible, renewable sources of energy, striving for sustainable development.

Our environmental policy
- To aim, in addition to providing for compliance with all relevant regulatory requirements regarding the environment, for reasonable continuous improvement of our environmental performance, this with a view to reducing our environmental impact to levels not exceeding those corresponding to the economically viable application of the best available technology.
- To take a proactive approach in our environmental activities, built on TQM principles, and guided by the 16 principles of the International Chamber of Commerce (ICC) "Business Charter for Sustainable Development".
- To be a world leader on the basis of:
    Moral obligation towards the environment
    Giving priority to investment for the environment
    Attracting the best young people and motivating the Company's employees in the challenge for a better quality of life.
- In addition to local regulations, we will strive to adopt the most stringent ecological standards of any country in which we operate.
- To apply the most stringent regulations at least one year before their implementation deadlines.

General principles
- Total Company environmental awareness is the basis for meeting these goals.
- The 16 principles of the "Business Charter for Sustainable Development" are the guidelines for continuous improvement.
- The Council regulation (EEC) 1836/93 of 29 June

STMicroelectronics Total Quality Environmental Management application versus ICC 16 principles

TQM General Principles	TQEM In STMicroelectronics	16 Principles By ICC
Management Commitment	- Corporate function for Environment Strategies - Environmental Management System - Environmental Policy by CEO - Environmental Decalogue - Standard Operating Procedures - Created Environmental Champions, Corporate and Site Environmental Steering Committee	- Corporate Policy - Integrated management
Employee Empowerment	- Environmental seminar for audit team people - Environmental seminar for sales - STMicroelectronics University environmental awareness seminars - Benchmarking program (internal and external) - Environmental suggestion program - Corporate environmental day - Environmental Decalogue	- Employee education
Fact-based Decision Making	- Corporate ECO audit based on EMAS - Site Environmental Assessment - Internal/External Working Groups - Benchmarking program (internal and external) - SPC (critical parameters)	- Compliance and reporting - Prior assessment - Research -Precautionary approach
Continuous Improvement	- Adopt the most severe environmental standards - Proactive approach and co-operation with local authorities - Annual improvement plans - Investments for environmental protection - Emergency Response Planning - Seminars forecast for suppliers	- Process of improvement - Transfer of technology - Facilities and operations - Contractors and suppliers - Emergency preparedness
Customer Focus (internal/external)	- Support and information to Customers - National/International Working Groups - Environmental Statement - End of life products disposal - Monitoring of company image perception (by customers and authorities)	- Customer advice - Openness to concerns - Products and services - Contributing to the common effort

1993 (Voluntary participation by companies in the industrial sector in a Community Eco-Management and Audit Scheme - EMAS) is an excellent guideline for what we have to implement in our sites to manage environmental issues, including environmental audit activities and methodologies.
- The ISO 14000 series provides similar guidelines to EMAS at the worldwide level.
- The TQM approach is the practical way of working and managing all the aspects of a business to achieve the best results. In the environmental world, this is termed Total Quality Environmental Management (TQEM).
- Our suppliers will be involved in adopting similar approaches to respecting the environment.

Organization
At the highest level, environmental concern is the responsibility of our Total Quality and Environmental Management (TQEM) organization, headed by a Corporate Vice-President. In 1993, we created an Environment Strategies and International Quality Programs (ES-IQP) organization within this group to help us achieve our vision, mission and policy.

The ES-IQP's duties include driving all our sites towards improving the Company's environmental performance as a whole and taking a proactive approach to the environment. To achieve these goals, the ES-IQP conducts periodical audits, develops and proposes environmental rules and objectives, coordinates plans to achieve them, promotes internal environmental training and in general promotes a Company-wide culture of environmental protection

Total Quality & Environmental Management (TQ&EM)
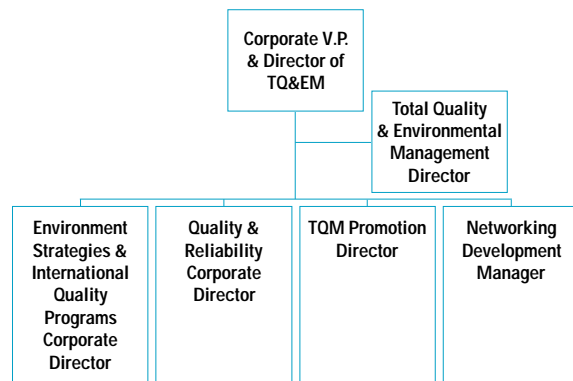
through leadership and example. The table "TQEM application versus ICC 16 principles" shows how we take account of the principles of TQM and the ICC Business Charter for Sustainable Development in the management of our environmental activities.

We have also created a Corporate Environmental Steering Committee (ESC), chaired by our CEO, to support all aspects of the Environmental Decalogue, including review and resource allocation. At the local level, each site has a Local Environmental Steering Committee and a Site Environmental Champion functionally reporting to the Corporate Environment Strategies organization.

All functions in the Company are responsible for managing the environmental aspects of their activities and support actions to meet our environmental targets.

Environment Strategies & International Quality Programs Organization And Main Activities

Environment Strategies & International Quality Programs Corporate Director

Assistant

| Program Manager Group Deputy	Engineering Manager	Program Leader	Program Leader	Energy Programs
EMAS & ISO company-wide programs	ES-IQP representative for France	Analysis and validation of Environmental investments company-wide	Interface with E.U., liaison with external organizations	Energy reduction projects
Corporate Environmental Data Bank implementation	World-wide monitoring of Environmental regulations	Answers to customer Environmental questionnaires and participation to external Working Groups	Preparation of presentations	Energy technologies evolution study
Support and interface with authorities, suppliers, sales areas and sites	PFC: secretariat of European PFC Task Force	Environmental assessment of our products	Customers' general specification approval co-ordination and groups interface	Renewable energy expertise & proposals
Preparation & revision of Corporate Environmental documents	New tools and methodologies study and proposal	Environmental data Corporate reporting	Co-ordination of external & internal information (internet/intranet)	Participation to Corporate teams for energy consumption assessment

Ownership of our Environmental Decalogue objectives

To ensure that each Decalogue objective receives our fullest attention and every effort is made to achieve it, we have assigned a Corporate Staff member to each objective. These "owners" are supported by a comprehensive structure of working groups in each area. Environmental Decalogue Owners are:

1. Regulations – Corporate VP and New Ventures Group General Manager
2. Conservation and 3. Recycling – Corporate VP for Manufacturing & Chairman of the Board of ST America
4. Pollution and 6. Waste – Corporate VP Back End Operations & Subsystem Product Group General Manager
5. Contamination – Corporate VP and Chief Financial Officer
7. Products and Technologies – Corporate VP and Central Research and Development Director
8. Proactivity – Corporate VP Strategic Planning and Human Resources
9. Measurement and 10. Validation – Corporate VP and Director of TQEM

Environmental investment

We regard investment in environmental protection as giving a significant advantage over those companies who wait. Indeed, we believe any investment will to a large extent be repaid if we are capable of designing and implementing pollution free processes that can also reduce the use of natural resources and energy. No investment we have made in energy conservation has taken longer than three years to recover and indeed the average payback time has been less than two years. In 1997 alone, our investments in energy conservation and efficiency allowed the Company to save $11M in electricity. In the same time frame the saving for water was about $5M.

Environmental investments for existing sites - % of total investments

Year	Value
1994	0.16
1995	1.96
1996	2.31
1997	2.54
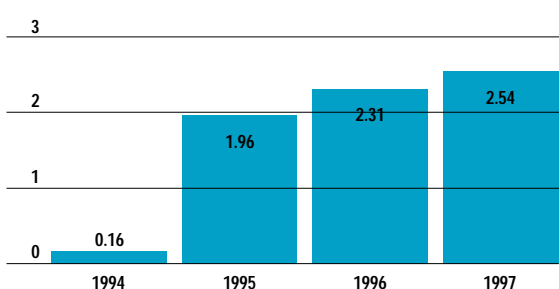
Problems

As we have implemented our sustainability initiative we have instituted numerous measurements and controls that were previously non-existant or less rigorous. In applying the most stringent rule we have also detected a few issues which, while still compliant to local standards, do not meet more stringent corporate ones. In addition, following acquisitions we have experienced some conditions requiring remediation to meet corporate standards.

In all cases that were in doubt we have addressed the issue with the local authorities and instituted appropriate corrective and/or remedial actions. The known cases 1993-1997 include:

Location	Discovery	Nature of problem	Action
Montgomeryville, Pa, USA	Acquired problem	Soil contamination from previous business	Remediation with EPA completed
Agrate, Italy	ST measurement	Ammonia concentration in discharged water - excursions close to limits	Ammonia use in production has been decreased (prevention)
Agrate, Italy	Measurement by authorities	Al in discharge water at 2ppm vs limit of 1ppm	Non-repeatable in following measurements. Authorities archived the case
Crolles, France	ST measurement	Excursions of fluoride concentration in waste water slightly in excess of limits	Major investment to reduce fluoride discharge, to be completed September '98
Crolles, France	ST measurement	VOC emissions excessive	Abatement investment completed Q2 '98
Rousset, France	Permit review	Several measures at limit due to growth	Renegotiate permit limits. Investment to reduce emission
Shenzhen, China	Acquired problem	Hydrocarbon soil contamination	Authorities informed, and asked to take remedial action. Frequent monitoring of ground water

OUR ENVIRONMENTAL DECALOGUE
TEN COMMANDMENTS FOR THE ENVIRONMENT

There is no quick fix for environmental issues just as there are no easy answers to environmental questions. STMicroelectronics has a "goal-oriented" culture and it is our firm belief that "what gets done is what gets assessed".

To ensure progress towards sustainability, we have established a set of ten quantified goals, our Environmental Decalogue. Progress is measured monthly or quarterly, and in recognition of our social responsibility, we will publish the results annually.

Corporations have concerned themselves with Environment Health and Safety (EHS) for many years, with responsibility usually falling under the HR department. Initially, "Environment" was understood as only including the elements of a company's internal work environment such as lighting, heat, noise and ventilation. The definition eventually grew to include cleanliness, ergonomics and ideas like the Japanese 5S. Today, under TQM, it even includes company culture, with surveys of employee satisfaction being referred to as "climate surveys".

The upsurge in corporate concern for environmental issues after the Rio meeting in 1992 also led to EHS often including the external environment. However, HR departments are ill-equipped to deal with this new definition. Since at ST we feel that this redefinition of EHS is both incorrect and confusing, we have chosen to distinguish clearly between the two concepts. EHS remains the province of HR and is still concerned with the internal work environment. Sustainability, on the other hand, is concerned with the company's impact on the atmosphere, lithosphere and society in general - in other words, the external environment. This, our first Corporate Environmental Report, is concerned with "Environment" only in the latter sense and therefore will not deal with any aspect of EHS.

The road to excellence is long and arduous. At STMicroelectronics, we have made a start and though there is certainly progress, perfection is still a distant aspiration. On the following pages we show the goals we are striving towards and the progress being achieved - and give representative examples from our sites around the globe.

1 REGULATIONS

1.1 Meet the most stringent environmental regulations of any country in which we operate, at all of our locations, worldwide.

1.2 Comply with all ecological improvement targets at least one year ahead of official deadlines at all of our locations, worldwide.

In addition to meeting all the local ecological/environmental requirements of those communities in which we operate, STMicroelectronics strives to exceed global and national environmental regulatory requirements in both scale and timeliness. The Company adopts the most stringent ecological standards of any country in which it operates and then applies those standards to every one of its sites worldwide.

In packing and packaging materials, for instance,

Germany has set the most rigorous standards of any country. Its most stringent regulation on the packing of goods requires the adoption of fully recyclable boxes and so STMicroelectronics applies this criterion throughout the Company, even in those countries where non-recyclable boxes are still acceptable.

Similarly, we have fixed "most stringent" corporate limits on parameters for waste water discharge and air emission. All our sites must meet these, regardless of whether the local limits are less onerous.

2 CONSERVATION

2.1 Energy - reduce total energy consumed (by our manufacturing, buildings etc.) per million dollars sold by at least 5% per year, with 25% reduction by end 1999.
Energy Consumption. The reduction target has been changed from "per million dollars sold" to "per million dollars of production cost". This is to prevent the indicator being affected by external factors such as market and price fluctuations.
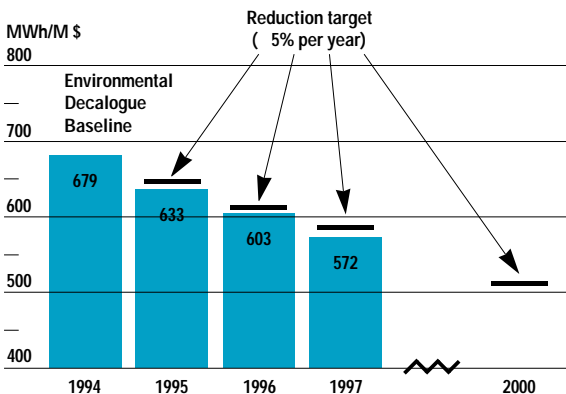**2.2 Water - reduce water draw-down (per million dollars sold) from local sources (conduits, streams, and aquifers) by more than 10% per year through conservation.**
Raw Water Consumption. The reduction target has been changed from "per million dollars sold" to "per million dollars of production cost". This is to prevent the indicator being affected by external factors.
2.3 Trees - reduce total paper and paper products consumption by 10% per year.

Energy

Using energy efficiently costs nothing and indeed adds value. STMicroelectronics has focused on increasing the efficiency of energy consumption to reduce emissions of greenhouse gases such as CO_2 and NOx at the power station. We have also been able to eliminate Class 1 Ozone Depleting Substances (ODS) on site by replacing them with more efficient alternatives. Efficiencies are gained in a number of ways - from extensive changes such as the installation of more efficient chillers to smaller initiatives such as the replacement of V-belts.

An important industry-wide benchmarking project was undertaken by SEMATECH, the foremost American laboratory in microelectronics research and development. This project surveyed 16 microelectronics wafer processing sites which were found to have in 1994 an average energy consumption of 270KWh per equivalent 10 mask level 6-inch wafer. The corresponding STMicroelectronics average, across all of our wafer factories, was 170KWh in 1994 and 159 at the end of 1997, when our best site was at 91KWh per six-inch wafer.

Water

Water conservation is always desirable, but it is an imperative at several STMicroelectronics manufacturing sites where water supplies are scarce or diminishing, such as Phoenix, Catania, Malta and Singapore. At a corporate level, STMicroelectronics has substantially cut its use of water, reducing the cubic meters used per million dollars of production costs from 11,300 in 1994 to 7,700 cubic meters in 1997.

At Carrollton, Texas, water consumption has been cut by substituting neutralized industrial waste water for mains-water.

In 1996, our site in Phoenix began a water reuse program for the acid scrubbers and cooling towers, saving 18 million gallons of water in that year and winning the Mayor's Award for Water Conservation. In 1997 the site implemented a recycling system to reduce water consumption by 50%.

ST Electricity consumption per million $ of production cost

ST Raw water consumption per million $ of production cost
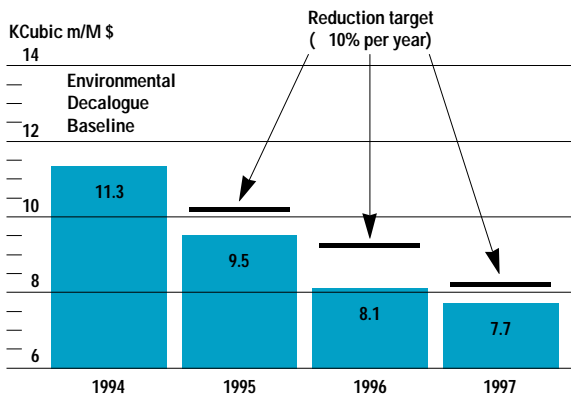
Trees

STMicroelectronics has thousands of different products in its portfolio. Each product has complex specifications and these need to be documented in detailed technical manuals, data-sheets and user-notes. Consequently, significant amounts of paper are used for publications and product packing.

We have nonetheless cut our worldwide use of paper by 29% in the period 1994-1997. By publishing technical documents on CD-ROMs we have cut the number of publications we print from 240 tons to 60 tons in just two years. In addition, we operate a corporate web-site to give our customers timely and accurate information without incurring the environmental costs of conventional printing.

Paper consumption

(Tons)

Year	Value
1994	1210
1995	1071
1996	961
1997	862

▬ Target
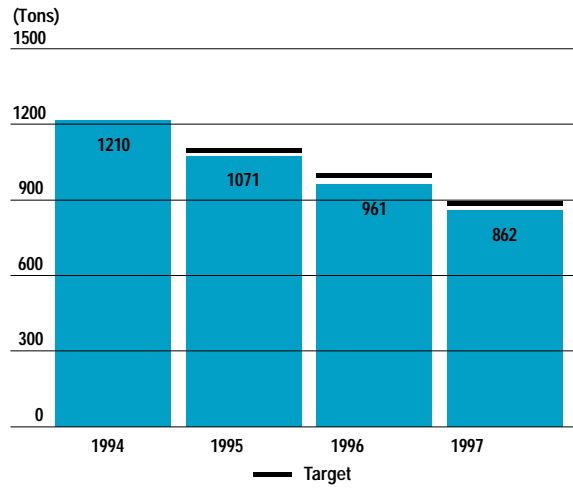
3 RECYCLING

3.1 Energy - utilize alternative energy sources (renewable/co-generation) to a meaningful degree. (At least three pilot plants by end 1999.)
3.2 Water - for all manufacturing operations, reach a level of 50% recycled water by end 1997 and 90% by end 1999.
3.3 Trees - reach a usage level of 90% recycled paper, where we must use paper, by end 1995, and maintain that level.
3.4 Chemicals - recycle the most-used chemicals - e.g. for sulfuric acid recycle more than 30% by end 1997 and 80% by end 1999.

Energy

The techniques which enable the use of commercially-viable, low-cost alternative energy sources are coming of age in the semiconductor industry. Co-generation, as well as alternative and renewable sources of energy are all being investigated.

Following a feasibility study at Catania, Sicily, we plan to construct a large co-generation facility in the near future. It will be among the first plants of this type in the world in the semiconductor sector. The power station will burn high efficiency methane to generate thermal and electrical power for the site, providing 10MW at full capacity. Any surplus heat will be used for water desalination. The plant will produce 450 cubic meters of desalinated water per hour, saving an annual total of 2.6 million cubic meters of underground water.

We are also experimenting with the use of renewable energy sources with pilot solar heater projects in Malaysia and photo-voltaic projects in Morocco, and we are investigating the possibilities of wind power in Morocco and France.

Water

Water plays a critical role in the manufacture of semiconductor products and because of the extreme sensitivity of processes which involve the removal of microscopic traces of dirt, dust or other contaminants, only ultra-pure water can be used. This is created by reverse osmosis and de-ionization. In addition, the water is specially treated and this consumes both energy and treatment chemicals.

By the end of 1997, 66% of the water used in manufacturing operations was recycled. We therefore comfortably exceeded the Decalogue objective.

In Malta, a microfiltration plant has been installed to recycle the wastewater from the silicon wafer-cutting process and this saves 13,000 cubic meters of city water annually. By recovering, cleaning and using waste brine to flush toilets throughout the factory an additional 6,500 cubic meters of city water is saved every year. By April 1998, a further project to recycle electroplating waste water had saved 58% of the plant's annual water intake.

Trees

By the end of 1997, 93% of the paper used by STMicroelectronics was recycled, thus reaching the Decalogue target, albeit two years late.

In just two years, the Agrate site in Italy has completely switched to recycled paper. By moving to electronic archiving the site also cut the amount of paper required annually for computer printouts from 50 to 36 tons between 1994 and 1997. As a result of similar initiatives, company sites in France now use 21.5% less paper for computer printouts.

Recycled paper

(%)

Year	Value
1994	46.2
1995	62.6
1996	76.8
1997	92.8

— Target
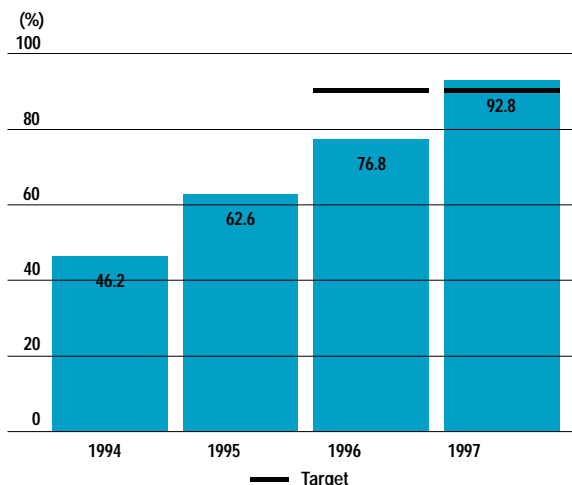
Chemicals

The microelectronics manufacturing process involves the use of highly reactive and toxic chemicals. Cleaning and rinsing operations in turn lead to the generation of waste effluents, air emissions and solids. Emerging solutions that we are using to reduce this waste include emission abatement technology, replacement chemicals and the optimization of processes. Research into further solutions is continuing.
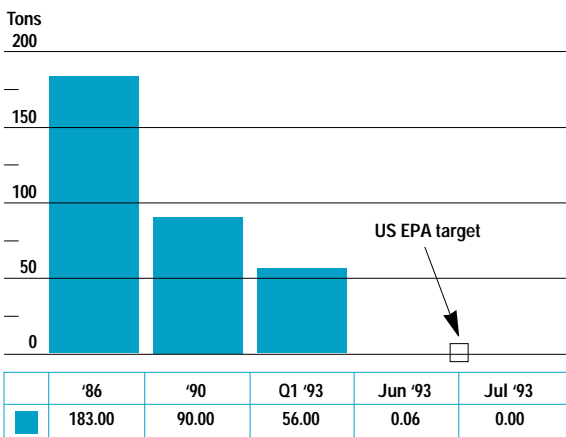
In Singapore, a sulfuric acid recycling plant at Ang Mo Kio has enabled the site to reduce its yearly requirement of sulfuric acid by 95%. The purchase of caustic soda needed to neutralize the sulfuric acid has been similarly reduced. This has led to cost savings of around $580,000 annually as well as a minimization of the plant's impact on the local environment.

At Tours, in France, acetone used in the cleaning process is now collected for transportation to a local distiller where it is regenerated. In a single year, around 99% or 32,800 liters of acetone have been re-used.
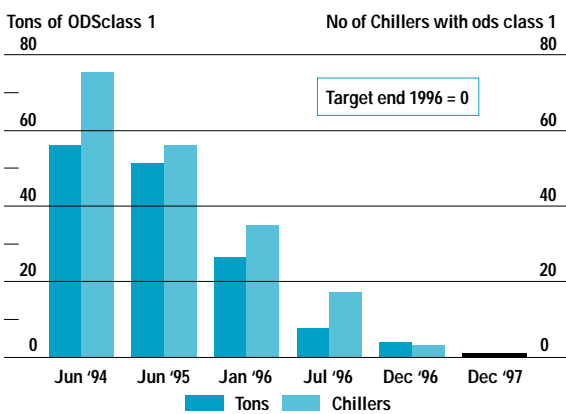
4 POLLUTION

4.1 Air emissions - phase out all CLASS 1 ODS by the end of 1996. Contribute where we can to the reduction of greenhouse and acid rain generating gases.

4.2 Water emissions - meet the standards of the most restrictive community in which we operate, at all sites, for waste water discharge.

4.3 Land-fill - achieve 100% treatment of waste at level 1 to level 4, of "Ladder Concept" preferability, with a half-life improvement goal of less than one year.

4.4 Noise - meet a "noise to neighbors" at any point on our property perimeter less than 60 dB(A) for all sites, from end 1995.
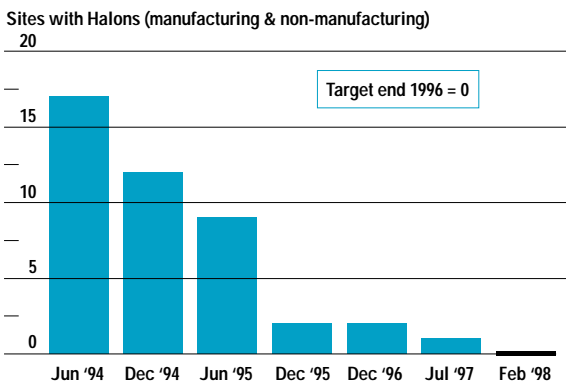
ST ODS class 1 consumption (in manufacturing processes)

Tons

US EPA target

	'86	'90	Q1 '93	Jun '93	Jul '93
	183.00	90.00	56.00	0.06	0.00

ST Chillers inventory

Tons of ODSclass 1   No of Chillers with ods class 1

Target end 1996 = 0

Jun '94   Jun '95   Jan '96   Jul '96   Dec '96   Dec '97

■ Tons   ■ Chillers

ST Halons inventory

Sites with Halons (manufacturing & non-manufacturing)

Target end 1996 = 0

Jun '94   Dec '94   Jun '95   Dec '95   Dec '96   Jul '97   Feb '98

Air emissions

By the end of July 1993, all Class 1 ODS in contact with products had been eliminated from production processes. All 75 chillers with Class 1 ODS were replaced with more efficient, economical and environmentally-friendly equipment by the end of 1997 and by February 1998, no Company sites retained fire-fighting systems relying on environmentally harmful halons. These actions required a corporate investment of some $20 million.

Manufacturing sites emit various pollutants to the air such as acids, alkalis, heavy metals and solvents. At most STMicroelectronics manufacturing facilities, site scrubbers have been installed to abate emissions of acid vapors and highly efficient systems destroy solvent emissions. We have installed equipment to cut the emission of Volatile Organic Components (VOC) and toxic vapors at several sites. At Carrollton in Texas, this equipment has reduced solvent emissions by 80-90% and 90 tons of vapors are now destroyed each year. Significant further investment in this area is planned across the corporation.

The semiconductor industry uses perfluorocarbons (PFCs) in the plasma-etching process. PFCs can contribute to global warming but the industry as a whole has not yet identified viable alternatives. Although at present the use of PFCs is not strictly regulated, STMicroelectronics has voluntarily agreed to reduce their use under an international voluntary agreement promoted by the US Environmental Protection Agency (EPA). In 1997 we were assigned the leadership of the European Electronic Components Manufacturers Association (EECA) task force, to establish a similar program in Europe.

Engineers at the Company's plant in Crolles, France, a test site for the reduction of PFC usage, have cut C2F6 emissions by 90% by installing abatement equipment. The resulting hydrogen fluoride is scrubbed out.

Water emissions
All sites have invested in waste water treatment plants and the extensive use of oil/grease skimmers has ensured that STMicroelectronics is well within authorized limits.

Our Agrate site in Italy is subject to the strict Italian waste water discharge limits of 6 milligrams of fluorides per liter and this is now our corporate standard. We have upgraded the existing Agrate waste water plant at a cost of $1,080,000 and recently installed a second plant to further reduce fluorides in the water. Today, fluoride concentrations in waste water at Agrate are now on average 3 mg/l, substantially below the legal limit of 6 mg/l. At our Castelletto site in Italy, a waste water plant driven by a fluoride detector keeps average fluoride concentrations down to only 2 mg/l.

At Crolles, in France, a significant increase in production meant that phosphate levels in waste water were threatening to exceed the most stringent corporate limits. This site now segregates and stores concentrated phosphoric acids separately before dispatching them to a specialized sub-contractor for treatment. Waste water phosphates have been reduced by a factor of five.

Bouskoura in Morocco has no local surface waters or municipal sewers to receive the site's waste water. Despite the lack of local regulations, we have installed a treatment plant which will not only treat all the site's waste water but will also allow the treated water to be reused. Consumption of external fresh water has fallen by 70%.

Land-fill
Solid waste can often be used for another purpose, and consequently waste separation increases recycling opportunities. Even burning waste can create energy if it is not possible to recycle or reuse it. At our Agrate site in Italy, we have constructed an "ecological island" where 20 different types of waste are collected safely in separate skips. Subsequent recycling minimizes the need to use local landfill sites. These initiatives are being repeated at other sites.

"Ladder Concept" Synthesis Of European Union Strategy For Waste Management		
LEVEL OF PREFERABILITY	**END OF LIFE TREATMENT**	**ECONOMIC IMPACT**
1	Prevention - avoid waste	++ saving at source
2	Reuse - use again for original purpose	+ replacement reduction
3	Recycle - recover for alternative use	+ Material recovery
3a	Recycle - organic conversion (aerobic or anaerobic)	+ Possible compost or methane
4	Combustion - with recovery of energy	+ Energy recovery
5	Incineration - no recovery of energy	- Consumes energy
6	Landfill	— Land consumption and contamination

Noise
Our Environmental Decalogue limits a site's noise emissions at the perimeter of the property to 60 dBA. Noise may be generated by nitrogen generating plants, cooling towers, air compressors, scrubbers or other operations. At each site, noise is measured periodically at strategic points around its perimeter.

The STMicroelectronics site at Rennes, France, is located in a particularly sensitive area as it is surrounded by housing estates. Noise linked to scrubber emissions was considered particularly critical and exceeded the corporate level of 60 dBA, so after a study in 1996 we installed silencers at critical points on the Epitaxy scrubbers. This led to an immediate and acceptable reduction in noise levels and the removal or upgrading of other scrubbers meant that by October 1997 noise levels at the most critical point on the site's perimeter were only 48 dBA.

Some sites audited in 1997 - Catania, Phoenix, Rancho Bernardo and Shenzhen - failed to meet the 60 dBA noise level limit. Active studies are underway to resolve this problem in 1998.

5 CONTAMINATION

Handle, store and dispose of all potential contaminants and hazardous substances at all sites, in a manner to meet or exceed the strictest environmental safety standards of any community in which we operate.

Semiconductor manufacturing requires the use of potentially contaminating chemicals and gases. Spills or leaks of acids, solvents, fuel or other chemicals are a potential hazard to the soil, groundwater and rainwater.

Where necessary, we surround liquid chemicals with containment structures to prevent contamination during an accident or emergency. In manufacturing areas, chemicals and toxic substances are stored in separate and clearly marked containers. All sites have an emergency response plan and an on-site emergency response team to make spills or leaks safe. At some sites, just-in-time chemical delivery is used to minimize chemical inventory.

Ground wells at the up-gradient and down-gradient of every site have also been installed to track the quality of the groundwater flowing under the location. Analyses are made at least once a year and more often if there is a potential concern.

At Carrollton in Texas we realized that the storage of liquid anhydrous ammonia posed a severe threat to the surrounding environment in the event of an accidental leak and so solved the problem by substituting ammonia with magnesium hydroxide, an equally effective yet less hazardous chemical.

We strictly monitor how our sites dispose of waste. Following a performance study, STMicroelectronics now operates a "manifest system" which requires a waste carrier to provide a written guarantee that the waste shipment will be handled and delivered in accordance with corporate instructions.

6 WASTE

6.1 Manufacturing - recycle 80% of manufacturing by-product waste (metal, plastics, quartz, glassware etc.) with a half-life improvement goal of less than one year.

6.2 Packing - Move to more than 80% (by weight) recyclable, reused or biodegradable packing materials (cartons, tubes, reels, bags, trays, padding) with a half-life improvement goal of less than one year.

We consider landfill to be an extreme solution, especially in the light of pending legislation to limit landfill to "ultimate waste" that cannot be recycled. To avoid landfill and meet our recycling and waste management targets, we are establishing corporate guidelines that define some 30 different categories of waste that should be collected separately.
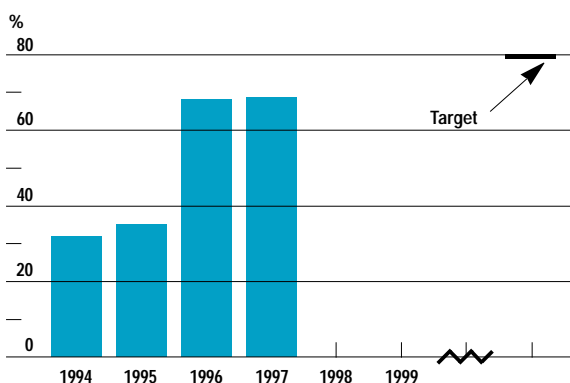
Manufacturing
Experience has shown that recycling waste is less expensive than discarding it. Our Tours site, in France, generates some 330 tons of treatment sludge a year that contains calcium fluoride and calcium sulfate. Since these chemicals are used in the manufacture of cement, the sludge is now removed by a cement manufacturer and this has reduced the plant's disposal costs by $16,700 a year. Similar initiatives and equivalent savings exist at Rousset, in France, and at Agrate and Catania in Italy.

ST Waste management improvement

Landfilled vs tot. waste   Reused + recyc. vs manuf. waste
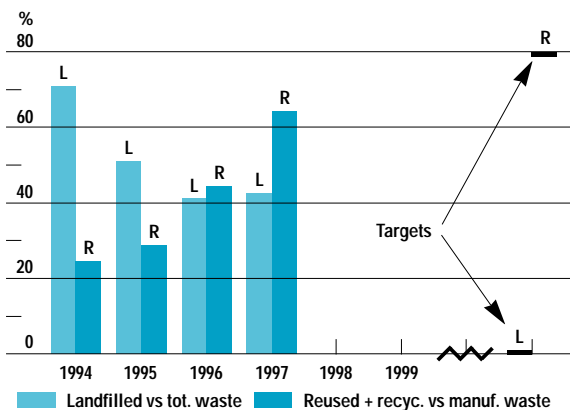
ST Packing waste (recycled + reused vs total)

Our Carrollton site in Texas is working to reduce the water and silicon content of its waste solvents to meet the requirements of a manufacturer of synthetic gas who is willing to take the solvents as a raw material.

Packing
STMicroelectronics is confronted with two problems regarding packing: we have to dispose of the packing that comes from external suppliers, and ensure that our own packing is recyclable or reusable. To facilitate this, we pack our products in homogeneous materials avoiding to use expanded foam with ODS and heavy metals. In addition, no chlorine-whitened materials are used and where possible, biodegradable materials are selected.

In wafer packing, our approach relies on reuse and recycling. Single wafer containers are designed to be reusable after cleaning. As a result of these measures, the percentage of reused and recycled packing waste has reached 70%, close to our Decalogue goal of 80% for the year 2000.

Information to customers
The current boom in electronics and the ever-increasing use of innumerable electronic products has sharply increased quantities of Waste from Electrical and Electronic Equipment (WEEE). An effective solution to this lies in a modern Design For Environment (DFE). STMicroelectronics, already committed to reduce the environmental effects of its industrial activities, cannot omit to help its customers in their efforts to search for the best DFE of their electronic equipment by providing all necessary and detailed information on its products. For this reason, we have published a technical report entitled "Chemical content of semiconductor packaging" that describes the chemical and physical characteristics of ST packages. The report contains detailed tables, each covering a package "family". A package family is a group of packages with a similar structural process and chemical/physical material composition. The report covers more than 250 packages with plastic, ceramic, glass and metallic cases that ST uses to encapsulate its huge quantity of products.

7 PRODUCTS AND TECHNOLOGIES

Accelerate our efforts to design products for decreased energy consumption, and to enable more energy efficient applications, to reduce energy consumed during operations by a factor of more than ten by the year 2000.

The semiconductor industry expects companies to continuously improve the speed and capabilities of their products. STMicroelectronics also recognizes its responsibility to design and manufacture products that are inherently less power-hungry or which enhance the efficiency of applications.

Our products already contribute directly to a cleaner environment. In the automobile sector, microelectronics applications reduce pollution by influencing ignition, fuel injection, fuel consumption and exhaust emissions. They also decrease the energy consumption of domestic appliances, with fuzzy logic chips cutting the energy used by air-conditioning units by almost 30%. Smart chips used in lighting decrease energy consumption and extend the life of fluorescent tubes, while microcontrollers improve a customer's ability to control the power consumption of domestic appliances.

Since 1990 we have been manufacturing power-saving chips to replace the magnetic ballasts in fluorescent lamp controllers. Each chip saves an average of 3W in a compact fluorescent lamp and 13W in a tube lamp. As sales of these lamps increase, the cumulative benefits become substantial: in 1996, the worldwide reduction of energy consumption in lighting systems brought about by the use of STMicroelectronics' high efficiency fluorescent lights was equivalent to the annual output of around 15 large power stations.

A working group has developed a way of determining the average energy consumed by our products in operation. For logic chips, we are on target to achieve our goal of a factor ten reduction relative to 1994 by the year 2000. For memory chips, new low voltage products will bring us in line by 1999. Power products are still under investigation.

8 PROACTIVITY

8.1 Proactively support local initiatives such as "Clean-up the World", "Adopt a Highway" etc., at each site in which we operate, and encourage our employees to participate. Undertake to lead in establishing such initiatives with local authorities, where none exist.

8.2 Sponsor an annual "Environmental Day" at each site in which we operate, involving the local community.

8.3 Encourage our people to lead/participate in environmental committees, symposia, "watch-dog" groups etc.

8.4 Include an "Environmental Awareness" training course in the ST University curriculum, and offer it to suppliers and customers.

The activities of a company such as STMicroelectronics can be vital in raising the environmental awareness of the community at large. We aim to foster progress which is sustainable and which does not require an unacceptable cost to society. Today, we are proactive locally, nationally and internationally. In addition, we promote environmental awareness daily throughout the Company as well as through formal education at ST University.

Thinking globally - acting locally
Tree-planting has been enthusiastically adopted by STMicroelectronics employees world-wide following

the Company's commitment to plant ten trees for every employee. We have had major tree-planting initiatives at a national park in Malta, around Casablanca in Morocco, on the banks of the river Molgora near Agrate in Italy and on the Massif Saint Victoire near Rousset in France.

Employees at our site in Phoenix, Arizona are involved with local environmental celebrations such as Earth Day. At Agrate, STMicroelectronics employees have helped establish a local center for Environmental Excellence in association with other companies and organizations. This is designed to increase the understanding of environmental issues in schools, businesses and local authorities.

STMicroelectronics works with national and international associations as well as with local groups. For the past five years we have co-ordinated European participation in the International Conferences on Environment, Safety and Health (ESH) sponsored by the Semiconductor Industry Associations (SIA), the European Electronic Components Manufacturers Association, the Electronic Industry Association of Japan (EIAJ) and the Korean Semiconductor Industry Association (KSIA).

STMicroelectronics was among the first companies to sign the voluntary agreement for assessing the problems of chemical compound emissions such as PFCs. As well as openly discussing the most efficient techniques for saving energy with other microelectronics companies, we are participating in the SEMATECH Energy Benchmarking project to determine the most efficient use of energy at wafer manufacturing plants.

ST University holds courses on "Environmental Awareness" on a regular basis. Since 1995, ST University has taught 12 environmental seminars, including three "Train-the-Trainer" modules designed to ensure that environmental awareness is cascaded throughout the Company.

Company involvement in trade associations

- Membership at the world-wide level:
• Steering Committee for the 1997 and 1998 International ESH Conference of the Microelectronics Industry;
• World Business Council for Sustainable Development
• Sustainable Business Forum (board member)

- At the European level:

EECA	- Chairmanship of the European Task Force on greenhouse gases (PFCs) reduction
	- Coordination of the European participation in the International ESH conferences (1994-98)
	- Membership of ETC (EECA Technical Committee)
	- Membership of ETC environmental working group (WG2)
ORGALIME	- Italian Representative in the Environmental Committee of ORGALIME (Liaison Group of the European Mechanical, Electrical, Electronic and Metalworking Industries)

- At the national level:
France

SITELESC	- Chairmanship of the Association
	- Chairmanship of the Environmental Group
	- Chairmanship of the Working Group on Waste (zero landfill in 2002)

Italy

ANIE	- Deputy Chairmanship of the Environmental Committee
	- Membership of the Working Group on Significant Chemical Substances
	- Membership of the Working Group on VOC emissions
AICQ	- Chairmanship and Secretariat of Environment and Quality Committee
UNI/ANPA	- Membership of the Working Group on EMAS guidelines for Italy
Milan Polytechnic	- Membership of the "Club of Companies for Eco-Efficiency"
Intersind	- Membership of the Environmental and Safety Working Group
AIAS	- Membership

9 MEASUREMENT

9.1 Develop measurements for, and means of measuring progress/achievement on points 1 through 7 above during 1995, using 1994 as the baseline where applicable, and publish results in the "environmental report" annually.

9.2 Develop detailed means and goals to realize these policies, and include them in Policy Deployment by the end of 1995.

**9.3 Continue the existing Environmental Audit and Improvement program at all sites.**

Measurement drives behavior and accurate auditing sets the framework within which we can specify, quantify and monitor our progress in reaching our goals. Without measurement, we could not achieve excellence.

Cross-company working groups address the details of major elements of the Decalogue. The progress made as a result of these corporate directives is controlled at each site by the Site Environmental Champion and each site reports its results to the Environmental Database, our worldwide measurement tool. This database provides inputs to our corporate environmental organizations and directives are fed back to each site after analysis.

All directives become targets and they are "owned" by the appropriate function or organization. Once the resources are allocated, action plans generate progress in a virtuous circle of increased accountability, learning and performance.

Corporate Environmental audits are conducted every 18 months at every site. Major environmental projects are monitored and reported to the Corporate Environmental Steering Committee which meets every quarter, chaired by the CEO. The permanent members of the Committee are the vice-presidents who have been designated as "owners" of each Decalogue objective.

Corporate environmental working groups
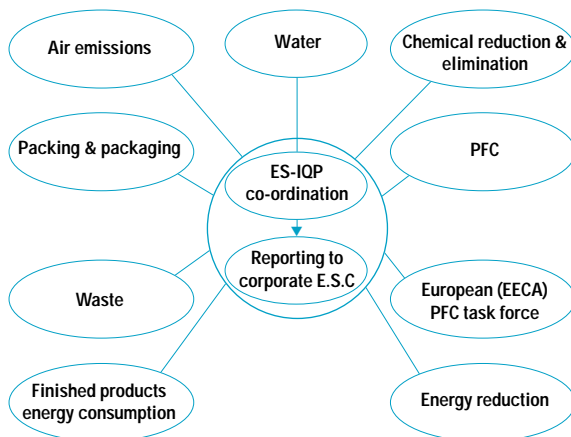
10 VALIDATION

Validate to EMAS standard, or equivalent, 50% of sites by the end of 1996, and 100% by the end of 1997.

EMAS

The Eco-Management and Audit Scheme (EMAS) is a voluntary scheme designed to help companies in the industrial sector measure their environmental performance. Validation of a company's performance within the EMAS scheme is achieved through:

- the establishment and implementation of appropriate company policies, programs and management systems
- the systematic, objective and periodic evaluation of a company's environmental performance
- the public provision, by a company, of information on its environmental performance.

ISO 14001

This is the latest international standard to define how an organization should formulate its policy and objectives on the environment, taking into account the relevant legislative requirements and any information regarding significant environmental impacts. The elements include:

- general requirements
- environmental policy
- planning implementation and operation
- checking and corrective action
- management review.

By the end of 1997, all 17 of STMicroelectronics' manufacturing sites had been EMAS validated and certified to ISO 14001. As a pre-requisite to obtaining EMAS validation, every site prepared and published a detailed Environmental Statement on its consumption of natural resources and release of substances to the environment. All sites update this statement annually, as required by EMAS.

Together with our suppliers, we are moving towards achieving our environmental goals. Our vendor ratings now include environmental parameters and reactions from vendors have so far been positive: a total of 86% of our key materials suppliers have already obtained, or are in the process of obtaining, ISO 14001 certification and 28% are undergoing the same process for EMAS. From 1999, EMAS validation or ISO 14001 certification will become a necessary condition for a supplier to remain on the STMicroelectronics Qualified Supplier List.

STMicroelectronics EMAS & ISO Highlights

Malta	1st for EMAS outside E.U. (November '95)
Singapore	1st for EMAS (December '95) and 3rd for ISO 14001
Rancho Bernardo (CA)	1st in the USA for EMAS (December '95) and ISO 14001 (February '96)
Crolles, Rennes, Tours, Rousset (France)	2nd, 3rd (registered January '96), 6th and 7th for EMAS
Muar (Malaysia)	1st both for EMAS (October '96) and ISO 14001 (August '96)
Catania (Italy)	1st for EMAS (registered December '97)
Cornaredo, Agrate Bza. (Italy)	2nd and 3rd for EMAS (registered February '98)
Ain Sebaa (Morocco)	Probably 1st in Africa both for EMAS (July '97) and ISO 14001 (March '97)
Shenzhen (China)	1st in China for EMAS (October '97) and 3rd for ISO 14001

Awards and accolades

Since 1991 the Company's sites have received more than 60 awards, of which 22 were for environmental issues:

1991
Champion, Clean and Beautiful Factory Competition
Muar, Malaysia

1993
First Landscape Competition
Muar, Malaysia

Cornucopia Award, Environmental and Health Coalition
Rancho Bernardo, California, USA

1994
Recognition: Malta Ecological Society
Kirkop, Malta

Trophy for Best Effort, Clean Up the World Campaign
Kirkop, Malta

Ministry of the Environment Award
Toa Payoh, Singapore

Charter Member, Clean Texas 2000
Carrollton, Texas, USA

Certificate of Merit, Recycling and Waste Reduction in the Workplace
Carrollton, Texas, USA

1995
Trophée Hélianthe: Prévention, Récuperation, Valorisation des Déchets
St. Genis, France

Winner, Environmental Achievement and Restoration That Help (EARTH)
Rancho Bernardo, California, USA

Certificate of Merit, Recycling and Waste Reduction in the Workplace
Carrollton, Texas, USA

Certificate of Environmental Responsibility
Carrollton, Texas, USA

Certificate of Plastic Reuse
Carrollton, Texas, USA

Certificate of Appreciation, Texas Lake and River Cleanup Program
Carrollton, Texas, USA

1996
Recognition, City of San Diego Environmental Services Department's Waste Reduction and Recycling Award
Rancho Bernardo, California, USA

Recognition, Valley Forward Association
Phoenix, Arizona, USA

Certificate of Appreciation, Texas Lake and River Cleanup Program
Carrollton, Texas, USA

Puliamo il mondo by LEGAMBIENTE
Agrate, Italy

1997
French Ministry of the Environment -- EMAS Certificate of Registration
All STMicroelectronics sites in France

EPA Ozone Protection Award
Kirkop, Malta

1998
"Prix gestion environnementale" from the French Ministry of the Environment and French Chamber of Commerce
ST France

European Better Environmental Award From Industry.
Category: Managing for Sustainable Development. Jury special commendation.
ST France

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