

ENTERPRISE BENEFITS FROM RESOURCE EFFICIENT AND CLEANER PRODUCTION

SUCCESSSES FROM PERU

Taking care of materials, energy, water, waste and emissions makes good business sense. Resource Efficient and Cleaner Production (RECP) is the way to achieve this. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of Metalexacto, Unique and La Pisqueña in Peru.

Successes at a glance

The Peruvian enterprises covered here demonstrate that it makes good business sense to improve resource productivity and reduce pollution intensity.

Metalexacto is a small lead foundry that, by implementing RECP, attained annual savings in the region of almost USD 19,000, as well as improved working practices and conditions. Even though the company focused mainly on decreasing energy use, the integrated approach used enabled increased materials recovery, a decrease of hazardous substances in waste, and a reduction of greenhouse gas (GHG) emissions.

RECP implementation in the tannery **La Pisqueña** led to annual savings in the region of USD 11,400, a credit reimbursement of USD 109,779, and improved product quality. While the initial intent of the company was to address the problem of effluents, the RECP programme enabled the company to also improve their energy productivity and reduce the quantity of GHG emissions generated per unit of production.

The benefits achieved by **UNIQUE**, a company producing cosmetics and jewellery, after continuously applying RECP measures include a reduction of energy use by 6%, reduction of water use by almost 30%, and a reduction of waste water by more than 50%, accounting for savings of more than USD 79,000 per year. Additional benefits were improvements in working practices and a reduction of the company's carbon footprint.

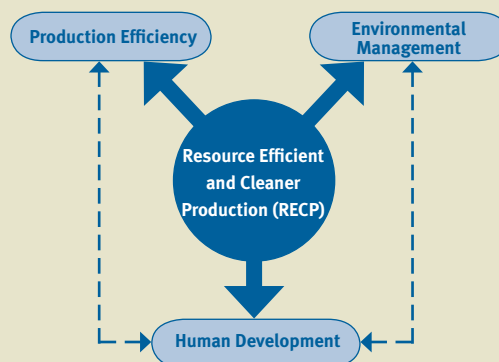
These successes were achieved with the assistance of the **Centro de Ecoeficiencia y Responsabilidad Social (CER)-Perú**. CER is part of the global RECP Network established with support of the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP).

Resource Efficient and Cleaner Production (RECP)

RECP builds upon Cleaner Production and related practices to accelerate the application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses the three sustainability dimensions *individually and synergistically*:

- **Production Efficiency**: optimization of the productive use of natural resources (materials, energy and water);
- **Environmental management**: minimization of impacts on environment and nature through reduction of wastes and emissions; and
- **Human Development**: minimization of risks to people and communities and support for their development.



METALEXACTO

Overview

Metalexacto is a Peruvian company that produces secondary lead by smelting and refining used lead from used acid batteries to obtain a refined secondary lead/antimony alloy. The plant initiated operations in March 2001 and is staffed by a Chief Engineer and four workers, two in the day shift and two in the night shift. The key benefits achieved by Metalexacto after continuously applying Resource Efficient and Cleaner Production (RECP) measures include the additional recovery of 34,7 tons of lead per year (worth approximately USD 16,980), improvements in working practices and a reduction of carbon dioxide emissions. RECP has led to savings of more than USD 18,830 per year.

Benefits

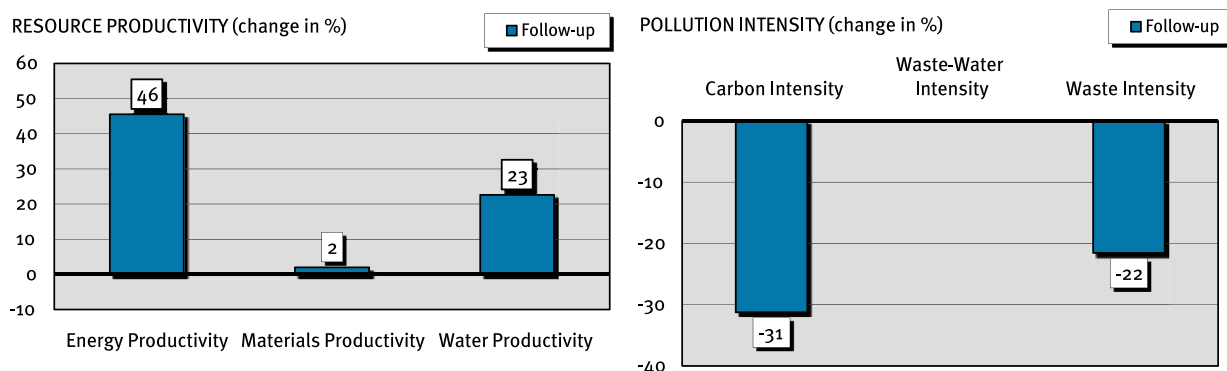
RECP has been a great cost-saving tool for the company and the measures implemented have led to reduced waste of materials and energy. RECP has improved the operating efficiency of the plant, improved product quality and has enabled the recovery of some of the materials that were previously wasted.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	-16	Energy productivity	46
Materials use	20	Materials productivity	2
Water use	0	Water productivity	23
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	-16	Carbon intensity	-31
Waste-water	0	Waste-water intensity	0
Waste	-4	Waste intensity	-22
Production output	23		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

Metalexacto RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases.

Areas of improvement

Metalexacto obtains refined lead from the oxides and sulphates from used lead acid batteries. These are introduced in a furnace and the lead is melted and then reduced until bullion of lead is obtained. The RECP options implemented had a short payback time (generally just a few months to one year). Most of the implemented options were low cost and were done by the staff of the company.

TABLE 2: OPTIONS IMPLEMENTED

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost-saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
Change of refractory bricks from 31% to 50% aluminum oxide (Al_2O_3) and installation of a hood on the furnace.	2,470	16,986 (lead sold) 450 (fuel)	Additional recovery of 34.7 tons of lead.	19% less lead in the slag, decreased quantity of waste.
Change of burner and optimization of residual fuel and diesel, and improved mixing of fuel in the refining process.	965	1,215	Decrease of residual oil use by 2.66%.	Reduced air emissions by almost 240 tons CO_2 eq.
Warming of the fuel by taking advantage of the residual heat of the oven.	280	184	Decrease of electricity use by 5,760 MJ.	

Note: The new refractory bricks have a higher content of aluminum oxide, which helps increase the refractory capacity of the oven (less fuel needed for heating) and also enhances the brick's life per unit of lead produced



Approach taken

The Administration of the company has shown a great interest in the measures that have been implemented and are committed to implement further approaches aimed at improving the company's environmental performance without diminishing the quality of its products and the productivity of the plant.

The key lesson learned, is that the following factors are crucial for a RECP success: involvement of employees at all levels (which can be considered as the greatest achievement made by the company), monitoring, evaluation and information on progress. The motto „Cleaner Production is not a destination but a way of life“ aptly describes the experience of Metalexacto.

„The conviction and cooperation of the whole organization are necessary for being able to make changes. Cleaner Production allows achieving savings, decreasing pollution, and improving working conditions as well as community relations. From this experience, we have learned to think in a different way, and to ask ourselves whether the traditional way of doing things is always the right way or if we can improve it. Finally, we conclude that we can always improve and that it is a never ending process“.

Adrian Stern, Metalexacto General Manager (December 2006).

Business case

Besides the savings mentioned above, working conditions have improved and commitment to continuously improve the company's environmental performance has been ensured.

LA PISQUEÑA

Overview

The tannery La Pisqueña S.A. is a company that produces fine leather and semi-processed leather or „wet blue“ for exporting, 15% of its products are destined for the national market and 85% for the international market. The company mainly processes cow, goat and sheep skins. The company has 46 workers and has assets of around USD 4,500,000.

The main target of the Resource Efficient and Cleaner Production (RECP) programme implemented at La Pisqueña S.A. was the treatment of effluents. Even though the company increased its production by more than 30%, energy productivity increased by 18%, and waste water intensity was decreased by 28%. The recycling and water treatment system will allow the company significantly to increase its production capacity. Moreover, the implementation of RECP options generated savings of around USD 11,400, as well as leading to a credit reimbursement of USD 109,779.

Benefits

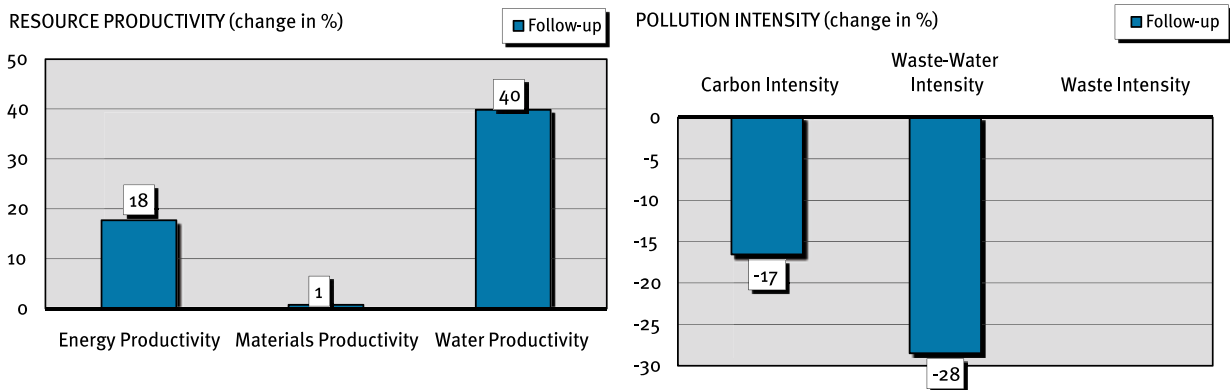
The project was mainly focused on effluent treatment, but special attention was also paid to energy issues, material use and processes. RECP not only enabled La Pisqueña S.A. to achieve savings from the decreased use of energy and resources, but also made it possible for the company to decrease their pollution of the environment and to act in a more responsible way.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	14	Energy productivity	18
Materials use	33	Materials productivity	1
Water use	-4	Water productivity	40
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	12	Carbon intensity	-17
Waste-water	-4	Waste-water intensity	-28
Waste	0	Waste intensity	0
Production output	34		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

La Pisqueña RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases.

Areas of improvement

The results were achieved through the implementation of the following measures:

- Making the peeling process without destroying the fur.
- Reducing the percentage of water in the initial washing and in the rinse process.
- Improving production processes with the purpose of reducing losses.
- Decreasing the percentage of salt use.
- Recycling water from different processes.
- Timing the processes by measuring water feeding.
- Improving the efficiency of the boilers.
- Insulating the pipes to avoid heat losses.
- Installing a hydro pneumatic tank.
- Implementing a complete effluent and waste treatment management plan.

TABLE 2: OPTIONS IMPLEMENTED

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
Improving production processes with the purpose of reducing losses.	990	4,230 *	Reduction of electricity consumption by 453,600 MJ *	16,5 tons of CO ₂ *
Improving the efficiency of the boilers.	200	2,860 *	Reduction of fuel consumption (2,860 gallons corresponding to almost 449,000 MJ) *	35 tons of CO ₂ *
Insulating the pipes to avoid heat losses.				
Installing a hydro pneumatic tank.	5,700	4,360 Including 30% reduction of waste-water treatment costs	Reduction of in water use by 2,492 kl	Reduction of waste water by 2,492 kl
Implementing a complete effluent and waste treatment management plan.				
Timing the processes by measuring water feeding.				

Note: In absolute terms, energy use and carbon dioxide emissions increased due to a 34% increase in production output. However, the increase was significantly lower than it would have been if RECP measures had not been implemented. The values presented and marked with * are calculated values of the reductions/savings achieved taking into consideration changes in production output. If RECP measures had not been implemented, then energy use would have been in the region of 902,800 MJ higher and carbon dioxide emissions would have been more than 50 tons higher.



Ex-post evaluation, chrome sampling



New equipment installed at the plant

Approach taken

The managers of La Pisqueña S.A. were worried about the effluents and wastes of their tannery. For this purpose the managers wanted to implement a recycling system and effluent treatment processes in their plant. The company got the approval of the Green Credit Trust (a credit supported by the Swiss State Secretariat for Economic Affairs, SECO) in November 2005 to implement these improvements. In order to get the credit, the company carried out a Cleaner Production program to fulfil the requirements of the Green Credit Trust. The credit was for 278,310 USD and due to the great environmental performance the company got a reimbursement of USD 109,779.

RECP is a great cost-saving tool that has enabled the company to reduce the waste of raw materials and energy. Through the implementation of measures, the company has been able to improve the operating efficiency of the plant, improve product quality and recover a part of materials that were wasted. The work at the company illustrates the principle of Pollution Prevention Pays especially since the investments needed to achieve improvements had short payback times (a few months to 1 year).

Business case

Although the project was mainly focused in effluent treatment, a direct positive consequence was also obtained in the peeling process, which has increased the value of the final products. RECP not only allows companies to achieve savings from decreased resource use, but also decreases pollution to the environment, which benefits the surrounding community.

UNIQUE

Overview

UNIQUE S.A. is a prestigious international corporation with more than 40 years in the market. The company produces cosmetics, perfume and jewellery of high quality. The company belongs to the Corporation Yanbal International and has annual sales in the region of USD 500,000,000. In Peru, Unique sales amount to USD 150,000,000 per year. The corporation Yanbal International has commercial offices in Bolivia, Peru, Ecuador, Colombia, Venezuela, Guatemala, Mexico and Spain. It has industrial cosmetics manufacturing plants in Peru, Ecuador, Colombia; jewellery plants in Colombia and Peru and fragrance plants in the United States and Switzerland. Yanbal International has more than 1,500 workers in Peru and a very active sale force of 120,000 people, in total, 350,000 are employed in the whole corporation. Unique has two plants in Peru, both of them located in Lima. After the implementation of Resource Efficient and Cleaner Production (RECP), the company improved water productivity, decreased waste water intensity and reduced carbon dioxide emissions.

Benefits

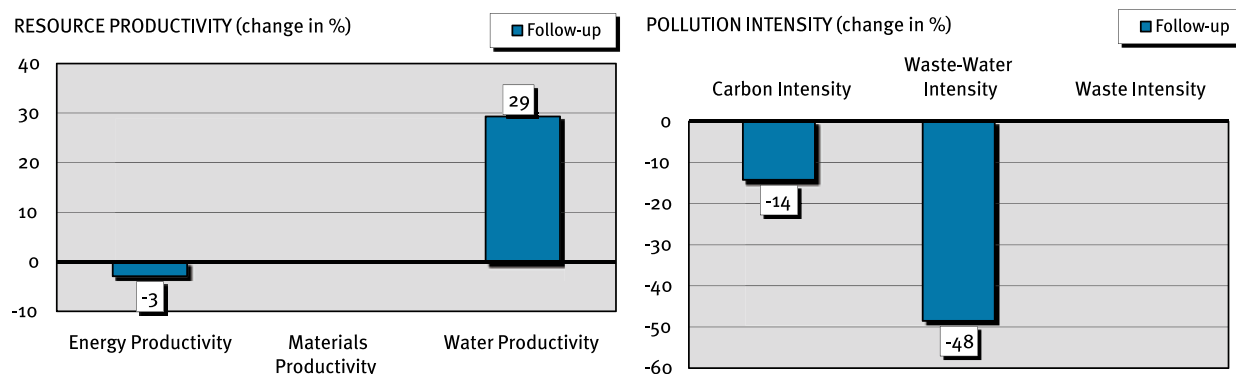
The benefits achieved by UNIQUE after continuously applying RECP measures include reduction of energy use (in absolute terms) by 6%, reduction of water use by almost 30%, and a reduction of waste water by more than 50%, accounting for savings of more than USD 79,000 per year. Additional benefits were improvements in working practices and a reduction of the company's carbon footprint.

TABLE 1: RESULTS AT A GLANCE

Absolute Indicator	Change (%)	Relative Indicator	Change (%)
Resource use		Resource productivity	
Energy use	-6	Energy productivity	-3
Materials use	0	Materials productivity	0
Water use	-29	Water productivity	29
Pollution generated		Pollution intensity	
Air emissions (global warming, CO ₂ eq.)	-22	Carbon intensity	-14
Waste-water	-53	Waste-water intensity	-48
Waste	0	Waste intensity	0
Production output	-9		

Note: The *absolute indicators* provide a measurement of how much resource use/pollution output has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The *relative indicators* provide a measurement of changes in resource use/pollution in relation to production output. *Resource productivity* provides a measurement of how much product output can be produced per unit of resource use, from a sustainability perspective, productivity should increase. *Pollution intensity* provides a measurement of how much pollution is generated per unit of production output, from a sustainability perspective, intensity should decrease.

Unique S.A. RECP Profile



Note: The RECP profile provides a visual overview of resource productivity and pollution intensity shown as change in % compared to the baseline values. Environmental performance is improved when resource productivity increases and when pollution intensity decreases. The main reason for the decrease in energy productivity is the decrease in production output by 357.8 tons.

Areas of improvement

The Plant in Lurin has production processes that can be continuous, batch or a combination of both. The plant divides its production in three lines: the solid line dedicated to compact manufacturing; the liquid line dedicated to perfume manufacturing; and the semi solid line dedicated to cream, gel, shampoo and deodorant manufacturing.

The RECP results were achieved through the implementation of the following measures:

Energy

- Improving the efficiency of the boilers.
- Recovering heat from the flue gases in the chimney.
- Insulating the water tanks.
- Decreasing the heat losses in the steam distribution line.
- Reducing the electricity bill by changing the peaks of the company demand to hours out of the peak time.
- Reducing electricity consumption by regulating and maintaining the compressors.
- Taking advantage of natural light.
- Reducing electricity consumption with good housekeeping.
- Changing bulbs with more efficient lamps.

Water

- Maximizing the recovery of condensates.
- Increasing the efficiency of water use for the cleaning and sanitation of equipment.
- Reusing output water from Reverse Osmosis process.
- Reusing treated waste water from the plant.

Materials

- Reusing alcohol from the cleaning process.



Workers performing with recycled materials at the presentation of the program at UNIQUE

TABLE 2: OPTIONS IMPLEMENTED

Principal options implemented	Benefits			
	Economic		Resource use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
Improving the efficiency in the boilers.	7,230	5,670	Reduction of fuel use. Reduction of energy use by more than 847,000 MJ.	Reduction of CO ₂ emissions by 374 tons.
Recovering heat from flue gases in the chimney.				
Insulating the water tanks.				
Reusing water from the rejects from the reverse osmosis equipment.	700	73,475.4	Reduction of water use by almost 20,000 m ³ .	Reduction of waste water by more than 20,000 m ³ .
Reusing treated waste water from the plant. Timing the processes by measuring water feeding.				

Note: Energy use was decreased by minimizing thermal losses. Also, in order to pay less for electricity, the plant does not produce at peak times when the cost of electricity is higher. Therefore, the plant has just changed its production schedule to hours when electricity costs are lower.

Approach taken

The lesson learned is that there are some key conditions that are needed for a successful RECP implementation programme. These conditions include: involvement of employees at all levels, monitoring, evaluation and information of the progress made. The success of the programme was ensured by the commitment and support of the management of the company. Plant workers were the most important stakeholders during the RECP programme; they showed a lot of commitment and also replicated their knowledge of cleaner production to their own houses. The motivation for change came from the Directors of Yanbal International who provided the guidelines for the programme, while the Corporate Industrial Department of Yanbal International supply chain was in charge of the implementation. One of the key successes of the programme is that staff at all levels was involved and committed to the process.

„We really feel very happy and motivated for this implementation; we believe it is our job. I hope that, in the future, when looking for ways to improve processes, there will also be an awareness of the need for taking care of the environment and preserving resources. The benefits are numerous, we are confident that we are getting more productive, more efficient, and at the same time more careful with the environment. For the community is good to know that they have an environmentally friendly partner in their neighbourhood. Our company is not necessarily a factory that affects the environment, but a factory that contributes to take care of the environment which also reflects our behaviour in the whole community“

Gonzalo Ravago, Corporate industrial Manager, May 2008

Business case

Besides all the benefits mentioned above, the RECP programme brought improvements in working practices and a reduction of the company's carbon footprint. This successful case can be a great chance for Unique to further improve its image as a responsible company, which could contribute to their efforts to increase market shares and revenues in the future.

ABOUT THESE SUCCESS STORIES

The United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate in their joint Resource Efficient and Cleaner Production (RECP) Programme. The RECP Programme aims at improving the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with a network of National Cleaner Production Centres (NCPCs) that have currently been established in some 50 countries. This series of enterprise success stories documents the resource productivity, environment and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity. A Primer for Small and Medium Sized Enterprises*, published by UNIDO and UNEP in 2010. The primer with accompanying calculator tool and further case studies are available at www.unido.org/cp and www.unep.fr/scp/cp.

Centro de Ecoeficiencia y Responsabilidad Social (CER)-Perú

The CER Peru was established in 2002, and is hosted by the non-governmental organization Grupo GEA. The centre offers services in the areas of Resource Efficient and Cleaner Production (RECP), Corporate Social Responsibility (CSR) and carbon neutral markets. By mid 2010, the centre had conducted cleaner production assessments, including carbon footprint measurements, in 55 enterprises and helped 28 enterprises with CSR related strategic planning. The centre was is actively working with ministries and local governments and participates in the administration of the Green Credit Trust Fund (supported by the Swiss State Secretariat for Economic Affairs) which has financed investments in 17 enterprises - amounting to a total of USD 3.35 million (www.cer.org.pe).

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