

## Cleaner Production Case Study

**Cleaner production** involves reducing the consumption of raw materials (including water and energy) and reducing the volume and toxicity of waste and other emissions.

### Industry:

Metal, galvanizing

### Galvanizers Association of Australia

The Galvanizers Association of Australia (GAA) is a non-profit technical organisation. Galvanizing is an after-fabrication process that protects steel from corrosion, thereby increasing its service life and construction efficiency.

### Project partners

The following GAA members participated in this program:

- Albury Galvanizing
- Blayney Galvanizing
- Galvanizing Services
- Galvatech
- Hunter Galvanizing
- Sydney Galvanizing.

GAA has been involved in continuous environmental improvement with NSW government departments since 1998, and has recently completed a partnership program with the Department of Environment and Climate Change NSW.

### Environmental successes

This is one of a series of case studies featuring companies that participated in the Department of Environment and Climate Change NSW \$5 million 'Profiting from Cleaner Production' Industry Partnership Program.

NSW companies are discovering that cleaner production not only protects the environment but also reduces operating costs, streamlines processes, boosts profits and improves staff engagement and morale.

# Galvanizing change across the industry

**A group of small-scale galvanizing companies worked together on a cleaner production program for two years, involving staff from all levels within the companies' operations. With the help of a consultant, the program took the participants through a process of education and establishing pride in good practice and team achievement.**

Plant operators became a growing source of ideas as their skills developed and their sense of accomplishment sparked further interest in acquiring knowledge. The environmental consultant working with the group led participants to appreciate and respect the principles of cleaner production. The program outcomes included measured improvements in production costs and operational cleanliness.

### What did they do?

The businesses took part in a joint training program that included plant maintenance and modifications, procedural improvements and skills development. A critical aspect of the program was improving zinc recovery from the galvanizing process, through disciplined, detailed analysis of chemical concentrations and milling mechanics.

Process improvements were investigated and trialled. For example, replacing insulation in kettles and process tanks led to reduced gas consumption per tonne of steel galvanized.

A further successful innovation was the integration of environmental and safety procedures data into existing production and quality management systems.

### Comments from participants

'It was refreshing to have a genuine partnership of ideas rather than enforced regulations which are often hard to understand.'

'The program created interest at all levels and gave the galvanizing operators a feeling of achievement and ownership of the results.'

'The investigation of environmental matters led to a better assessment of the economic success of the businesses.'

'The partnership led to greater sharing of improvements and innovation from all of the separate companies within the GAA NSW chapter.'

### Zinc's contribution to sustainable development

Galvanizing is a zinc coating process which uses no volatile organic compounds. It has been in use for 170 years, basically unchanged. Well-documented case studies show that galvanizing vastly extends the useful life of steel goods and structures and reduces the cost of their maintenance.

Zinc is endlessly recyclable without any loss of its physical or chemical properties. About 30% of the world's zinc supply comes from recycled zinc, and about 80% of the zinc available for recycling is indeed recycled. Due to the durability and long life span of most zinc products, which in some cases last maintenance-free for over 100 years, much of the zinc produced in the past is still in use, constituting a valuable and sustainable resource for future generations. Global reserves of zinc ore, far from depleting, have in fact increased over the past 25 years.

*Left: The skill of operators and cooperation of the industry were crucial elements in making savings.*

*Right: One step in the galvanising process—components being dipped in a bath.*



## Why did they do it?

The two main objectives were to improve resource efficiency and reduce waste so that galvanizing businesses can run more efficiently and become more environmentally sustainable.

The outstanding achievement of this environmental program was the exchange of specialised knowledge between many robust competitors. After-fabrication galvanizing is a unique dip-coating application process which is further dependent on steel handling skill and metallurgical knowledge. Permutations of these fundamental inputs create specialisation across steel weight, shape, length and other post-fabrication configurations. Much of this capability is competitive proprietary information. However, in this forum vital factors such as alloy additions, temperature controls, bath dwell times and coating allowances in relation to product shape or product use were discussed in an open and unselfish way.

## What were the environmental gains?

Four plants achieved considerable reductions in resource usage during the program. Two other plants, which had previously taken part in a cleaner production program and had already made resource usage and process efficiency gains, also achieved a parallel drop in waste generation.

Each of these advances in resource usage was derived from a distinct phase within the galvanizing process. Cooperative study by consultants and operators led to improved methods and efficiencies, and operator skill and competence were critically important in achieving these results.

## Where to now?

Inevitably, different plants found different opportunities, but the results overall signal good prospects for further

## What were the environmental and financial benefits?

### Annual savings, resource usage

Resource	Quantity saved	Annual saving
Zinc	89 tonnes	\$222,500
Acid	97.6 kL	\$39,040
Water	5,400 kL	\$5,508
Natural gas	1,590 GJ	\$6,010
Electricity	32,300 kWh	\$197,030
Greenhouse gas	148.5 tonnes CO <sub>2-e</sub>	—
<b>Total savings</b>		<b>\$470,088</b>

### Annual savings, waste generation

Waste	Quantity saved	Annual saving
Dross	33,300 kg	\$36,297
Ash	11,000 kg	\$7,920
Waste Acid	225 kL	\$22,500
<b>Total savings</b>		<b>\$66,717</b>

Total savings from improvements in both resource usage and waste generation amounted to \$536,805.

improvements across the industry as a whole. It is confidently predicted that these gains will prove to be conservative, and that long-term monitoring of the new procedures will show greater improvement. Further gains can be expected as levels of understanding and skill increase.

The cohesion of the galvanizing and zinc industry is pivotal to its ability to operate reliably and efficiently, and to deliver value in terms of both industry and community benefit. Cooperating with galvanizing industry associations internationally, GAA intends to continue to address environmental and sustainability matters on many fronts.

## More information

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