

## What A Waste



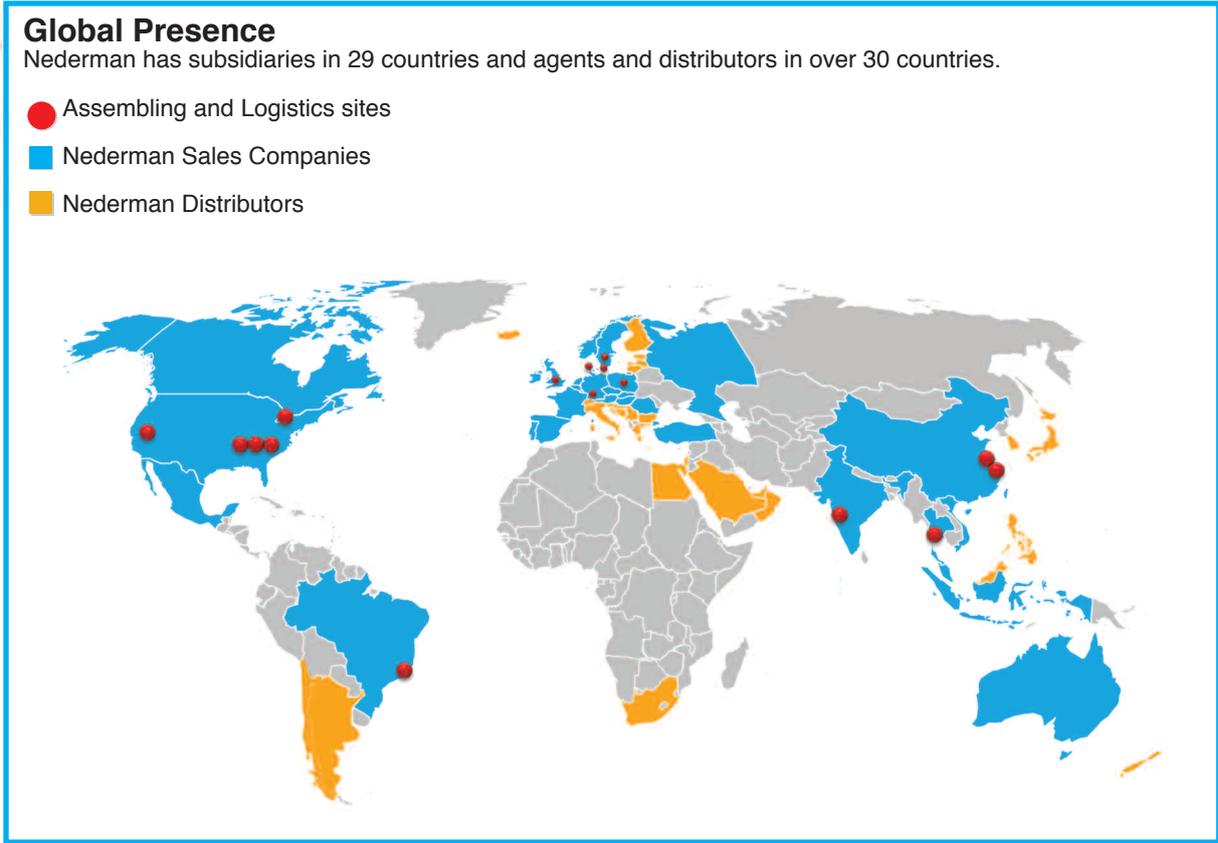
**Increasing UK Manufacturing's  
Profitability in Recovering  
and Recycling Metals**

**A Research Report  
By Nederman UK**

# About Nederman

Nederman is one of the world’s leading companies supplying products and services in the environmental technology sector, focusing on industrial air filtration and recycling of metal swarf, coolant and wood waste. The company’s products and systems are contributing to reducing the environmental effects from industrial manufacturing, to creating safe and clean working environments and to boosting production efficiency.

Nederman’s offering encompasses everything from the design stage through to installation, commissioning and servicing. Sales are carried out via subsidiaries in 29 countries and agents and distributors in over 30 countries. Nederman develops and produces in its own manufacturing and assembly units in Europe, North America and Asia. The Group is listed on Nasdaq OMX, Stockholm.



## Introduction

Nederman is one of the world's leading experts in reclaiming and processing waste materials from manufacturing processes. We work globally for some of the world's leading businesses across a wide range of industrial sectors.

This report uses our experience, and the data we have collated, to quantify how much money UK manufacturing is potentially wasting due to inefficiencies in extracting and recycling the waste by-products of production.

For the purpose of this exercise, we have concentrated on manufacturing machining shops and related processes mainly using high value metals. This is because the issues under scrutiny are broadly similar whatever the end product being manufactured or the material being used.

In future reports we will tackle how these issues vary for other types of manufacturing processes and materials.

Our aim with this report is to encourage organisations to look again at the efficiencies of their current systems in order to help improve their profitability at a time of economic difficulty. Nederman can provide consultancy to help with this process if required.

This is especially relevant after a period where metals have significantly increased in value, increasing the potential return on any investment.

We also aim to demonstrate the knock-on benefits of these improvements that help to both reduce unnecessary costs and an organisation's environmental impact.



### **Our Mission**

With a unique knowledge base in applications, products and systems - we contribute to efficient production, environmental benefits and safer workspaces

### **Our Vision**

To be the global leader of competence in solutions for eco-efficient production



## The focus of this report

There are very few ‘metals-led’ manufacturing businesses in the UK of any significant size that do not recycle their waste materials in some form.

This situation has been created partly by increased environmental awareness and legislation, but also by the rising prices of metals and growth of a strong scrap recycling industry that serves the manufacturing sector.

For this reason, the areas under scrutiny are not the rates of recycling, but the efficiency and profitability of current reclaiming and recycling practices. We also examine the capital costs of improving systems and the potential return on investment.

### Issues affecting profitability

The profitability of reclaiming and recycling in metal manufacturing is mainly affected by following factors:

- The state of the swarf that is being reclaimed and how it is then processed for recycling.
- How the coolant used in the manufacturing process is being recovered and recycled.
- The impact of the above on the associated costs of recycling, for example the transportation of the swarf once reclaimed.

To help illustrate our findings we have created five model businesses that represent different industries. In each case we have created a ‘typical’ model based on our experience of working in those sectors and then considered what this might mean for that sector as a whole across the UK.



#### **Our five models are:**

1. Car Engine Plant
2. Aerospace Component Manufacturer

#### **Component manufacturing using:**

3. Steel – such as a tools manufacturer
4. Aluminium – such as a metal furniture manufacturer
5. Brass – such as a door hardware manufacturers



# Summary of Findings

There are number of key findings demonstrated by this report:

1

Recycling in itself is not enough to ensure you are maximising profitability. Companies can be wasting hundreds of pounds on every tonne of swarf they are sending for recycling.

2

The amount of money wasted depends on the metal being used and the type and amount of coolant present in the waste.

3

In our examples the increased profitability per tonne ranges from £172 to over £609.

4

The value of the metal itself is not always the biggest factor in this calculation, especially if neat oil is being used as coolant or if the swarf to be transported is particularly bulky.

5

Organisations that have already conducted a cost benefit analysis would be wise to look again. The changing values of metals have dramatically affected calculations in recent years.

6

In the case of our typical car engine plant, changing the point in the metal's price cycle at which a value is taken can almost halve the predicted payback for the capital investment required.

7

Considering predicted future changes in metal prices and changes in materials being used, it is also wise to future-proof the system being used for the recycling.

# The Formula for Increased Profitability

The major choice faced by manufacturers is whether to process waste materials themselves or to leave this to a recycler. To make this judgment, manufacturers need to be able to see how this will increase profitability, either by increasing the value of the scrap metal produced or by reducing the costs associated with the recycling process.

These benefits then need to be weighed against the cost of any necessary capital investment for an in-house system. In the case of most manufacturers, using metal machining these in-house systems tend to operate by:

- Making the swarf easier to process: for example if the swarf is bushy and tangled it can be crushed and chipped to make it easier to purify.
- Purification of swarf by removing moisture: swarf tends to be covered in tramp oils and coolant from the manufacturing process. Cleaning the swarf and passing it through a centrifuge can remove moisture.
- Separating and reusing liquids: this moisture can be separated into its component oils and coolant and then re-used or recycled. The value of this process varies depending on the % 'wetness' of the swarf and the value per litre of the coolant used.
- Purification of swarf by separating other metals: for example, swarf of non-ferrous metals may still have a high ferrous content due to contamination during the production process. This can be removed using magnetic rollers to create a much purer end product. The value of this process depends on the % and type of different metals involved
- Briquetting for transport: making the resulting swarf as dense as possible to reduce the number of lorry journeys required to transport it to its next destination. The value of this process varies depending on the change in density from the original output.

Therefore our formula for profitability has a number of variables we need to consider for each of our scenarios. These are:

## **Swarf:**

- A. The increased value of the swarf produced after processing.
- B. The quantities of swarf produced.

## **Coolant:**

- C. The value of the coolant recovered, or saving by being able to reuse coolant.
- D. The quantities of coolant recovered.

## **Transport:**

- E. The reduction in transport costs after the swarf has been chipped and briquetted to maximise its density.

This leads us to the following formula for increased profitability (IP)

$$(A \times B) + (C \times D) + E = IP$$

## So let's apply our formula to our five 'typical' models.

### SWARF:

- A. £100 per tonne (the increased value of the aluminium swarf produced after processing).
- B. 1,000 tonnes per year (the quantities of swarf produced).

### COOLANT:

- C. £1.25 per litre (the value of the coolant recovered - emulsion).
- D. 16,000 litres per year (the quantities of coolant recovered).

### TRANSPORT:

- E. £52,000 (the reduction in transport costs after the swarf has been chipped and briquetted to maximise its density – a total of 260 fewer journeys).

### CAR ENGINE PLANT

**INCREASED PROFITABILITY = £172,000**

### AEROSPACE COMPONENT MANUFACTURER

### SWARF:

- A. £50 per tonne (the increased value of the aluminium swarf produced after processing)
- B. 700 tonnes per year (the quantities of swarf produced).
- A1. £150 per tonne (the increased value of the titanium swarf produced after processing)
- B1. 70 tonnes per year (the quantities of swarf produced).

### COOLANT:

- C. £1.25 per litre (the value of the coolant recovered - emulsion).
- D. 12,320 litres per year (the quantities of coolant recovered).

### TRANSPORT:

- E. £40,040 (the reduction in transport costs after the swarf has been chipped and briquetted to maximise its density – a total of 200 fewer journeys).

**INCREASED PROFITABILITY = £100,940**

### SWARF:

- A. £12.5 per tonne (the increased value of the steel swarf produced after processing)
- B. 2,250 tonnes per year (the quantities of swarf produced).

### COOLANT:

- C. £3 per litre (the value of the coolant recovered – neat oil).
- D. 360,000 litres per year (the quantities of coolant recovered).

### TRANSPORT:

- E. £93,000 (the reduction in transport costs after the swarf has been chipped and briquetted to maximise its density – a total of 266 fewer journeys).

### STEEL MACHINE TOOLS MANUFACTURER

**INCREASED PROFITABILITY = £1,201,125**

**ALUMINIUM FURNITURE  
MANUFACTURER**

**SWARF:**

- A. £50 per tonne (the increased value of the aluminium swarf produced after processing)
- B. 1,125 tonnes per year (the quantities of swarf produced).

**COOLANT:**

- C. £1.25 per litre (the value of the coolant recovered – emulsion).
- D. 146,250 litres per year (the quantities of coolant recovered).

**TRANSPORT:**

- E. £187,500 (the reduction in transport costs after the swarf has been chipped and briquetted to maximise its density – a total of 536 fewer journeys).

**INCREASED PROFITABILITY = £432,812.50**

**SWARF:**

- A. £100 per tonne (the increased value of the brass swarf produced after processing)
- B. 1,125 tonnes per year (the quantities of swarf produced).

**COOLANT:**

- C. £3 per litre (the value of the coolant recovered – neat oil).
- D. 180,000 litres per year (the quantities of coolant recovered).

**TRANSPORT:**

- E. £33,107 (the reduction in transport costs after the swarf has been chipped and briquetted to maximise its density – a total of 95 fewer journeys).

**INCREASED PROFITABILITY = £685,607**

**BRASS DOOR HARDWARE  
MANUFACTURER**

**The UK Wide Picture**

The potential increased profitability is significant not just for individual businesses, but for UK Plc as a whole. For example, if the results from our typical examples were to be applied across the entire sectors we see some startling results\*.

<b>Sector</b>	<b>Potential Increased Profitability Across Whole Sector (UK)</b>
Automotive	£6,020,000
Aerospace	£26,648,160
Door Hardware	£198,140,423
Machine Tool	£162,151,875

(\*Size of sector based on figures from Office of National Statistics - Aluminium furniture market size not available).

# Assessing Return on Investment:

These different levels of profitability then need to be viewed alongside the projected capital expenditure of the in-house system to judge whether the payback makes investment desirable.

However, these calculations also need to be viewed against a number of factors, particularly the potential future values of metals, any likely changes to the metals being used in production and other additional benefits in any given circumstance.

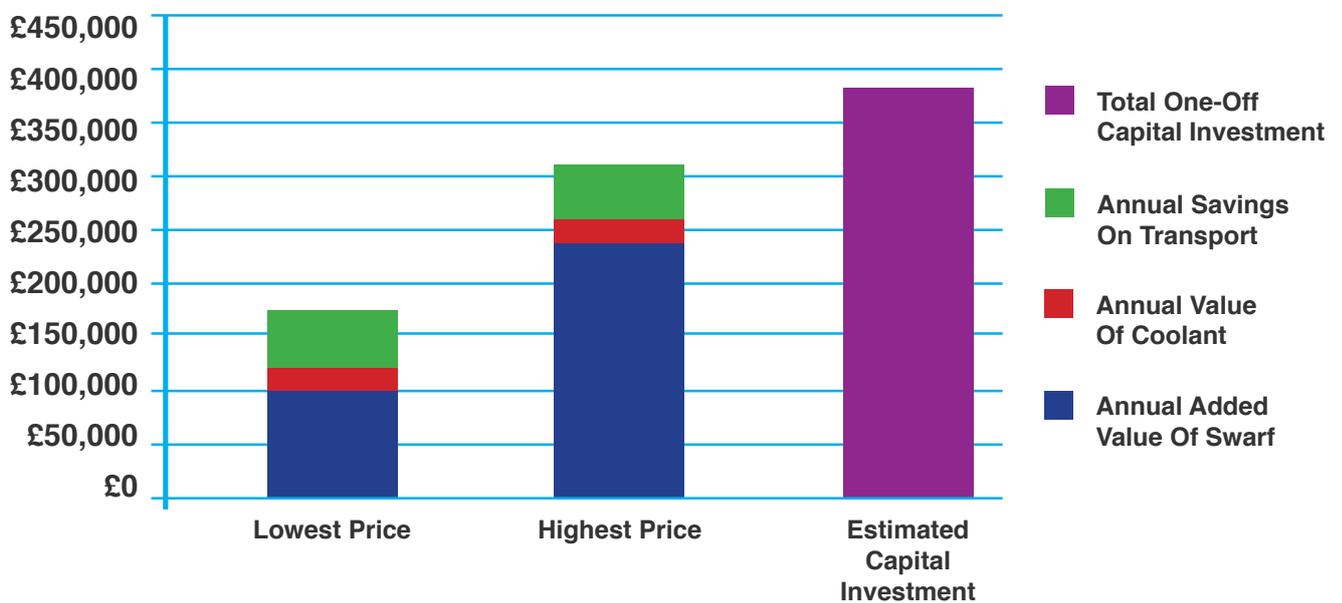
## Future Proofing Profitability

One of the reasons why the opportunity for increased profitability is so high is the rise in the value metal. Calculations on ROI are often made based on current market rates and yet these decisions have an impact on profitability and efficiency that can last 10 years or more.

In the last 10 years the price of aluminium for example has varied by 137% between its lowest and highest point. Taking our model car engine plant, the chart below shows how reducing the value of aluminium, alters the increased profitability and time taken to repay the required capital investment.

Assuming a total capital investment of £390,000, the number of months required to repay the total investment is either 15 or 27 depending at which point in the metal’s market value cycle the calculation is made.

Given that the underlying trend is upward, the rising prices of metals should be factored into a business’ decision making process.



## Changes in Materials

Another key consideration is how the use of metals may change during the lifespan of the system. For example, the use of titanium is starting to increase within the automotive sector and, while it is limited to prestige and specialist models at present, many are predicting its use will spread into mainstream manufacturing (e.g. for exhaust systems) within the next two years.

Given that titanium is many times the value of metals such as aluminium, even this relatively small level of usage could dramatically increase the profitability of more efficient reclaiming and recycling.



## Additional Benefits

In addition to the factors considered in this report, we often find additional hidden benefits. These can include:

- More efficient production processes: one of the areas we always look at is how the swarf is being created in the first place. Often we can suggest changes that will help to produce swarf that is easier to process with reduced moisture. This can also help to reduce machine downtime, more efficient use of coolant and increase output.
- Better working conditions: introducing up-to-date, efficient systems can create cleaner working environments and make better use of available floor space.
- Reduced energy costs: another consideration can be the energy savings of updating to more efficient systems.
- Environmental benefits: reducing the number of lorry journeys and energy consumed means a lower environmental impact.
- Reduced labour costs: a new system may increase the level of automation within the reclaiming and recycling process, meaning that time is freed up for other tasks.



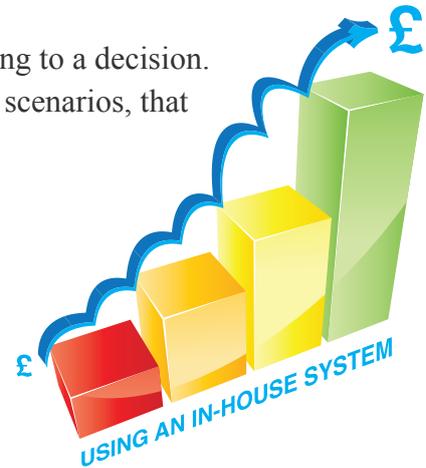
## Summary:

### So what advice can we offer to manufacturers based on this evidence?

#### Look at More than Just Metal

The first point is to consider all potential savings before coming to a decision. We can see, by breaking down the figures across a number of scenarios, that the value of metal is just part of a much bigger picture.

Reclaiming and re-using coolant and reducing transport costs are often what tips the balance in favour of opting for an in-house system for processing swarf. Failing to do so can mean you handing your potential profits to recyclers rather than using them to protect and grow your own business.



#### Consider Future Trends

The second point is to assess your capital investment over the full lifespan of the new system. At a time of global recession the value of metals can vary wildly as international demand rises and falls. However, as with any finite resource long-term pressures are likely to force prices upwards.

Also, changes in demand for specific products or technological advances can seriously affect the price of specific metals. For example, if the mainstream motoring industry begins the wide-spread use of titanium this increased demand could see its value increase considerably.

#### Take a Holistic View

Finally, be sure to consider the additional potential benefits of any change – for example of improved working conditions, greater automation in the process and a reduced carbon footprint.





Nederman is one of the world's leading companies supplying products and services in the environmental technology sector. With focus on clean air, safe and efficient workspaces and solutions for recycling - Nederman solutions contribute to safer working environments and reduces the environmental impact from industrial processes around the world.

Nederman's offer on the market encompasses everything from the design stage through to installation, commissioning and servicing.

# **Nederman**

[www.nederman.co.uk](http://www.nederman.co.uk)

Telephone: **08452 743 434** - Email: [info@nederman.co.uk](mailto:info@nederman.co.uk)

Unit 91 Seedlee Road, Walton Summit Centre  
Bamber Bridge  
**Preston**  
Lancashire PR5 8AE

Limewood Approach  
Seacroft  
**Leeds**  
LS14 1NG