



**UNTHA**

**Alternative fuel  
production for the  
cement industry**

**A global study**

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## Foreword

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The production of alternative fuels for the cement industry is not a new phenomenon. Globally, the use of a feedstock such as Solid Recovered Fuel (SRF) has continued to grow in popularity, due to the economic, environmental and societal benefits associated with this fossil fuel substitute. And with engineering advancements – not to mention mounting legislative, commercial and ‘green’ pressures – innovation progresses at pace.

The processing technology used to manufacture alternative fuels is becoming smarter. This presents new opportunities for the cement industry and its supply chain, in the form of cost effectiveness, input material flexibility, output ‘product’ quality, energy efficiency, ease of maintenance, and improved safeguarding for operators.

Consequently, even experienced alternative fuel manufacturers continue to review the shredding marketplace, to ensure best value investments for their facilities. Some existing installations are approaching the need for an upgrade, and new pre-processing or co-processing plants are being built all the time.

Elsewhere, new alternative fuel markets are emerging, typically driven either by shifts in Government mindsets, or the cement industry’s own relentless push to spur change. In these such nations – where alternative fuel production is in its relative infancy – the demand for knowledge, guidance and best practice, is high.

But while the industry continues to break new ground in alternative fuel production, ‘best practice’ is still hard to define. This report therefore explores a number of international projects, trends, and viewpoints, to help build a clearer picture, and empower readers to make optimal investments in their shredding technology.

The alternative fuel production market may be maturing, but a world of opportunity still remains untapped.

*Peter Streinik*  
*UNTHA shredding technology*



## Introduction

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The utilization of alternative fuels within the cement industry, dates back to the 1970s, when the oil crisis forced the need to consider a more affordable substitute energy source. Notable adoption therefore began in the 1980s.

But the ability to transform residual municipal, commercial, industrial, hazardous and agricultural wastes into an alternative fuel actually presented multiple benefits. Cement kilns could reduce their reliance on ever-depleting fossil fuels, communities and supply chains had the opportunity to strengthen their waste management infrastructure, and crucially,

energy could be recovered from materials that still contained inherent resource value. Considering the ever-growing demand for concrete – and the fact that global cement production reportedly exceeded 4 billion tonnes in 2020 – these multifaceted environmental advantages have been welcomed.

Consequently, interest in alternative fuel production has risen over the last forty years, and ongoing research and development has progressed in parallel. The goal now – as is often the case in most production environments – is to achieve ‘more with less’.

From a processing perspective, this means the ability to mechanically shred a greater volume and diversity of ‘waste ‘materials, to achieve more varied output specifications, as defined by the cement end user. At the same time, operators now strive to reduce the amount of capital equipment required, where possible – recognizing that this protects their initial financial outlay, and liability to ongoing maintenance costs. If the energy efficiency of such technologies can also be improved, the fiscal benefits are further strengthened.

## Turning 'waste' into energy

Increasingly varied types of 'waste' are being transformed into alternative fuels in the present day. These include municipal solid waste (MSW), multiple commercial and industrial (C&I) wastes, tyres, mattresses, and wood, to name just a few.

However, it is important to acknowledge that these different raw materials require sophisticated pre-processing to improve the quality of the resulting fuel, before they can be used as an energy source in a calciner or main burner.

Fuel quality can be defined by a number of factors including moisture content, chlorine content, particle homogeneity, and the physical properties of the fraction itself. However, given the inherently varied nature of 'waste', the overarching objective is to achieve as much predictability as possible.

Waste shredding technology forms a critical part of this fuel transformation process, with industrial shredders lying at the heart of alternative fuel production lines. The exact requirements of the shredder will vary from one project to the next, hence the need for machinery that is engineered to be flexible, by design.





***...SRF has highly fluctuating properties, and the combustion of secondary fuels such as SRF is heavily dependent on those properties, i.e., moisture content, physical properties, particle characteristics, chemical composition, and homogeneity.***

***...The heating value and proximate analysis are the minimum pre requisites to assess the thermal recovery behavior and performance of the fuel. The heating value specifies how much heat is released (at standard temperature and pressure) when the fuel is completely combusted. The proximate analysis gives the quantity of moisture, volatile matter, fixed carbon and ash in the fuel.***

***“Opportunities and challenges of using SRF as an alternative fuel in the cement industry”***

2023 Amila C. Kahawalage, Morten C. Melaaen, Lars-Andre Tokheim

## The search for best practice

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In an industry striving to make ongoing progress – from both an economical and environmental standpoint – the search for trends and ‘best practice’ is both common and understandable. ‘Knowledge is power’ after all. So, as some cement manufacturers continue to push boundaries when producing and utilizing alternative fuels, others inevitably watch eagerly, keen to learn from their peers’ developments so they can advance their own sustainability agendas. This is how innovation drives change on a colossal scale.

And fossil fuel substitution strategies are undoubtedly gathering pace – even in countries where waste-to-energy infrastructure is in its relative infancy. But the world is a big place, and the market remains fragmented. So, while some general trends can be observed, it is therefore important to remember that what is right for one cement kiln, is not necessarily best suited to the next. This may always be the case.

## Understanding different terminology

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Despite the global maturity of the alternative fuels market, definitions and specifications continue to vary.

In places like Thailand, anything below 100mm is seemingly considered a Solid Recovered Fuel (SRF). Whereas, for many other cement firms, a true SRF would need to be a much more refined fraction of circa 30mm, with a rougher 100mm shred referred to as a Refuse Derived Fuel (RDF). Either way, in general terms, these waste derived fuels have a high calorific value, lower moisture content, lower levels of metal contamination, and particle homogeneity to reduce burn volatility – with SRF being the far more specified and standardized of the two. The European Standard EN 15359 Solid Recovered Fuels – Specifications and Classes achieved some clarity in this respect.

The composition of such fuels is also important. For example, some European off-takers formerly preferring a flock-like SRF are now looking for a higher proportion of palletised product. Preferences certainly vary from one end user to the next, presenting a complex landscape.

What’s more, certain nations favour different terminology altogether, with Process

Engineered Fuel (PEF) a popular topic in Australia, for example. PEF – similar to Packaging Derived Fuel (PDF) – is commonly manufactured from dry, combustible fractions such as plastic or paper, that cannot be recycled due to contamination levels. Then there are also TDF (Tyre Derived Fuel) chips. This continues to play a large part in the global secondary fuels landscape, especially in parts of Asia, and Türkiye, where locally produced and imported TDF makes up 50% of alternative fuel feedstock.

This ambiguity and diversity is not a new problem. However, it reinforces the point that there can be no single ‘rulebook’ when it comes to alternative fuel production. Instead, the supply chain needs to be clear on every kiln’s specific requirements.

Thankfully, processing technology has advanced to the extent that ultra-precise – and varied – output specifications can now be achieved, often in a single pass (with only one waste shredder). Before any alternative fuel production line is built – or optimised – the composition of the input material, and the definition of the output ‘product’, must therefore be understood in detail.

## Defining the project driver – the move to greener technologies

Despite the diverse market, one thing that can be said, is that there are usually only a small number of core factors driving demand for alternative fuels.

The decarbonisation of the notoriously energy-intensive cement manufacturing process is one – and while ‘green cement’ is nothing new, market reports do signal significant ongoing scale-up efforts worldwide.

At the forefront of change are projects such as that of materials technology company Fortera, in California, reported to be directly capturing CO<sub>2</sub> from an adjacent conventional cement production facility, to create 15,000 tonnes of ready-to-use ‘green cement’, per year. The build of new carbon capture and storage plants – or the retro-fitting of existing facilities – is likely to become an increasingly popular topic in journal articles over the coming years.

However, regardless of whether cement firms can fund such colossal projects, there are still further gains to be leveraged from waste-to-energy processing technologies.







For example, there is little point manufacturing a secondary fuel to achieve 'green' benefits, if the machinery used to shred the 'waste' is energy-intensive – it certainly undermines the net environmental gain of the overall process. This is why global cement procurement teams are opting for electric-driven shredding technologies that are up to 75% more energy efficient than their diesel hydraulic counterparts. It is even possible – and increasingly popular – to run such machines using solar power.

The efficiency advantages are further compounded if the alternative fuel can be manufactured in a single pass – with only one machine, rather than needing to run a primary and secondary shredder, and sometimes further ancillary sorting and processing equipment.

But more awareness is still required, with many operators still not believing – or even knowing – what is possible with a single step solution. Engineering feats have advanced significantly, with slow speed, high torque shredders able to comfortably tackle a range of input materials for operational flexibility and resilience, while achieving an on-specification alternative fuel product.

The simpler the line, the easier the maintenance regime, the less likely the risk of downtime, and the lower the whole life running costs of the plant.

This is not to say that 'quick SRF' is right for everyone. Sometimes a complex design of ancillary equipment can break completely new ground when it comes to alternative fuel production, particularly when shredding down to an ultra-refined product size. It all depends on the requirements of the kiln, particularly when manufacturing a main burner fuel.

## Wider technology considerations

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The cement plant's technology itself must also be considered – not only the machinery used to manufacture the fuel.

It is possible to shred tyres without any pre-processing effort, for example, using a slow speed, high torque single shaft shredder, with a magnet situated over an in-built discharge conveyor, to remove the wire content. The result is a rubber chip, sized to the off-taker's specification, as well as an additional revenue stream from the clean metallurgic material that can be sold for remanufacturing.

For many cement plants with limited feed potential or aged equipment, the removal of this metal contaminant is critical as it would risk binding the TDF product. However, at a cement plant in Austria, some residual steel is not considered to affect the fuel quality – in fact, it increases the calorific value of the TDF, so is actually sought.

And while some larger capacity cement plants can easily accept a 50-100mm (2-4") TDF, most European plants will only take 25-50mm (1-2").

Once again, specifications will differ from one cement manufacturer to the next, depending on multiple factors including the burn zone, the width of the calciner, and how material is conveyed into the burner, to name just a few.

Whatever the criteria, consistency is key, so the machinery manufacturer's industry-specific experience will add real value here.

**“Poland’s continued fossil fuel usage reflects our mining sector working tightly with energy producers. Our current waste to energy landscape may therefore look different to some other European countries, but progress is ongoing and there is huge market potential. The supply chain needs to unite to share knowledge and drive change.”**

Pawel Pietowski,  
UNTHA Polska



## Cost saving potential

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In a world increasingly passionate about saving the planet, environmental progress is often cited as the primary reason for businesses making a change – and the cement industry is no different. That change is critical too, considering that – aside from waste – concrete is the most used material, globally.

But in addition to these more altruistic drivers, cement manufacturers should not be ashamed of striving to save money. The ability to reduce CO2 certificates doesn't only represent a 'green' benefit – it achieves significant financial savings too. UNTHA's Austrian HQ hosted a delegation from India last year, where the smallest cement firm to visit produces 40% more cement than the biggest plant – that we know of – in Austria. The switch to SRF represents vast economic potential.

And however bold the ESG pledges of cement manufacturers, it was the Government's removal of fossil fuel subsidies that contributed to seismic change in the UK. If carbon credits reach the USA, this will really open up the market.

## Geographical progress

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Usually, but not always, the highest alternative fuel adoption rates exist in the countries, states or local communities, where governing bodies acknowledge the multifaceted benefits of the waste-to-energy chain.

Türkiye, for example, is the second largest cement exporter in the world, and the largest cement exporter in Europe. The country's decarbonization agenda is therefore strong. It is reported that 1.5 million tonnes of alternative fuels were used in 2022, with the country importing tyres and increasingly exploring the use of biomass to meet demand.

In countries with more emerging waste agendas – typically when legislation hasn't previously forced the change – it is often the cement firms that are driving progress. Take Latin America. Here, the cement industry is pushing the Government for change, not the other way around. There are fewer legislative pressures due to the available landmass, officials typically only stay in power for three years so party politics make it difficult to evoke progress, and the tipping fee at landfill sites is low, so the financial driver is lacking. Brazil,

Mexico and Colombia seem to be leading the charge at present, but movement is also being seen in Chile, Peru, and Argentina. It is an exciting market to observe, right now.

In Africa, change is being witnessed in Nigeria, where the Government's landfill diversion strategy is becoming stronger. In Morocco, economic, industrial and political stability – plus depleting fuel resources – means progress is likely here too. Tunisia may follow when the Government stabilises.

Let's not forget that over two billion tonnes of municipal solid wastes (MSW) – and counting – are generated globally every year, with the figure expected to rise a further 70% by 2050. Pre-processing or co-processing facilities that can take control of these waste arisings while upholding their energy recovery strategies, will therefore achieve much-needed environmental, economical and societal benefits. Increased supply will also de-risk cement firms' alternative fuel production strategies, through greater feedstock security.



## Project spotlight: CEMEX Colombia

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An UNTHA XR3000C has been commissioned at CEMEX Colombia's Ibagué plant and is now fully operational, capable of treating up to 1,500 tonnes of solid waste per month to produce a homogeneous alternative fuel.

Internationally recognized for its one-pass SRF production capability, the XR is a preferred choice for cement manufacturers and waste operators aiming to convert waste into energy, reduce

fossil fuel usage and enhance environmental credentials. As part of its Future in Action program, CEMEX has set a climate action target of less than 475 kg CO<sub>2</sub>, representing a >40% reduction in CO<sub>2</sub> emissions by 2030.

While CEMEX has experience in alternative fuel production globally, UNTHA IBÉRICA provided support to the Colombian team throughout the procurement process to identify the most suitable

shredding solution. Miguel Rocha, manager of Regenera, emphasised UNTHA IBÉRICA's responsiveness to their needs, particularly for a shredder capable of processing various waste materials and controlling costs.

UNTHA IBÉRICA's aftersales engineers remain in close contact since commissioning to ensure the shredder's continued performance and provide ongoing operational optimization advice.

## Mattress processing for SRF

In the UK, two static single shaft waste shredders sit at the front of a sophisticated mattress processing facility, where 100% of a mattress's component parts can be segregated, recovered, and diverted from landfill.

The line produces an SRF flock with high calorific value of circa 24MJ and virtually no contamination, in a single pass. Following that, downstream magnetic systems further clean up the metal for optimal resale values.

The two shredders can handle 300 mattresses per hour, which equates to over 1.1 million mattresses salvaged from landfill per annum.



**"No other mattress shedder will give you this material liberation on the belt. With UNTHA, the numbers really stack up in terms of throughputs, output quality and revenue potential. It's easy to operate too, not to mention clean and green."**

Martin Price  
Managing director, Textek



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in action





## Country spotlight: Türkiye

As the Turkish cement industry is the second largest cement exporter in the world – with 56 plants – it is no surprise that the alternative fuels market has developed enormously, since 2021. In fact in recent times, UNTHA has made monthly shredder deliveries into the country, with more than 30 XRs supplied for SRF and TDF plants over the last two years alone. These projects include the largest cement plant close to Istanbul, where a stationary XR with conveyors produces a TDF chip, and an XR installation in Ankara which transforms commercial waste into a highly-refined <30mm fraction.

This rapidly-growing customer base – and

cement plants' continued investment in shredding technology – drove the establishment of UNTHA Türkiye as a locally available service partner. Further machine demonstrations and trials are now ongoing, with the XR shredder able to perfectly adapt to the industry's typical 30-50mm particle sizing requirements, thanks to UNTHA's world-renowned screen change system.

"Unlike other parts of Europe, Türkiye must handle very mixed waste. Cement customers therefore seek resilient and flexible shredding technology, capable of handling various materials, using only one machine. Resistance to foreign objects such as sand, stones and metal, is also critical,

to protect plants' 24/7 uptime needs, and protect the machine from wear and breakdowns.

But customers also like working with UNTHA Türkiye because of our people, not just our machinery. We have a deep cultural understanding of the market, and the decarbonization challenges and opportunities that the cement industry face. This, combined with our locally available support, long into the future, means we are a critical partner, as the industry advances its "Fit for 55" plans."

*Taner Topcu, UNTHA Türkiye*



## Project spotlight: Heidelberg Materials, India

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In 2023, the world's number one aggregates and ready-mixed concrete firm Heidelberg Materials revealed a new single-step alternative fuel production line in India, with the help of UNTHA shredding technology.

The system was installed at the Yerraguntla cement plant in Andhra Pradesh, owned and operated by Zuari Cement — a Heidelberg Materials Group company. This well-known Indian firm has a cement manufacturing capacity of 7.1 million tonnes per annum.

Handling both pre-sorted and unsorted municipal solid waste collected from throughout the region, it can process 20 tonnes of 100-500kg/m<sup>3</sup> density material per hour, to produce a renewable fossil fuel substitute, used to fuel the cement plant.

An UNTHA XR3000C shredder designed for continuous operation in 50°C temperatures, lies at the heart of the facility. With in-feed and discharge conveyors including a magnetic belt for metal separation, the plant can achieve a high-quality, homogenous 80mm output in a

single pass. The segregated metal content is separated and the residual on-specification fraction is used by Zuari Cement as RDF. The XR3000C shredder has been engineered to handle a range of input materials with ease — including those notoriously considered too difficult to process or economically unshreddable. Zuari Cement has already proven the machine's flexibility, having shredded MSW, as well as industrial plastics, textiles, tyres, rubber, paper and biomass materials requiring further refinement for optimal co-processing.



***When we began the search for a shredder for this facility, we had stringent requirements. We sought heavy duty technology that can withstand the pressures of shredding unsorted waste, and achieve refined fuel, in impressive quantities, in only one step. Our global experience was helpful in drawing up a shortlist, then we found the UNTHA XR3000C to have a number of technical advantages over competitors. The machine operates at a lower speed without compromising on capacity, for example, which results in lower wear. This means more uptime and lower whole life running costs.***

Robert Sweigart | Heidelberg Materials' AF expert

***This shredder is easy to install, operate and maintain, meets our expectations in terms of performance and allows us to vastly improve our flexibility to co-process various kinds of alternative fuels available in the market. The goal is for our co-processing facility to produce 8,000-10,000 tonnes of RDF per year.***

Mr Manish Shah | Head of the India Technical Center

***We are passionate about driving environmental progress throughout our business, and the use of alternative fuels is one way to do that. But this waste-to-energy feedstock comes at a cost, which is why co-processing makes so much sense. When designing this plant, we needed to ensure versatility to allow for changing market conditions, and an investment in technology that makes commercial sense and is built to last.***

Vimal Jain | Technical Director





## From the archives: UNTHA shreds production waste in Vietnam

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In 2015, UNTHA shredding technology announced a project with cement manufacturer Holcim, in Vietnam.

Here an UNTHA XR3000C waste shredder was extensively configured, re-engineered and trialled, to tackle a notoriously difficult material – footwear production ‘waste’.

Comprising a mixture of tough materials – rubber, textiles, plastics, metals, sponge, reinforcements, and more – this waste requires a very robust shredding solution. The XR’s cutting concept was refined and

two 113kW motors installed to provide sufficient, yet energy efficient, power. Designed for maximum efficiencies, the result is a single step shredding solution with only one machine, rather than a pre and post shredding operation. Complete with discharge conveyor, over band magnet and control room, the entire plant was fully pre-fabricated and pre-assembled in Salzburg, for acceptance testing by the client, Holcim Vietnam, and its Swiss technical support group. A 95% <80mm SRF specification was exceeded, with 97% of materials consistently achieving the required

particle size, consistently high (15-20GJ/t) calorific value and 10 tonnes per hour throughputs. The continuous rotor speed also proved the system’s uptime robustness.

For heightened safety, the equipment was manufactured with an anti-explosive Atex-specification coating, and intelligent in-built fire suppression technology.

The output fuel was sought for Holcim’s local cement kiln calciner.



## Service Waste triples alternative fuel production with new UNTHA shredder

Fort Worth-based Service Waste has halved its landfill costs, tripled throughputs, and boosted operator efficiency by 50%, with the investment in a new UNTHA XR3000C stationary shredder.

The family-owned Texan organization originally took delivery of the first UNTHA XR shredder to be commissioned in the USA, almost a decade ago. Over the years, the machine has processed an average of 480 tons of commercial, industrial, and pallet waste per week, transforming this locally collected residual material into an alternative fuel for the cement industry.

Fast forward to 2024 and with customer demand continuing to rise, Service Waste sought to supercharge its shredding capabilities once again. The company has therefore invested in a new, larger 24-ton XR shredder.

The versatile machine with a 9'8" aperture, can comfortably handle a range of difficult, bulkier input materials, with the shredder currently configured to produce a 2<sup>3</sup>/<sub>4</sub>" particle size. In-built resistance to foreign objects such as rogue metal content, protects the machine from damage and ensures this material can be extracted with

ease. The result is a high-quality, homogenous, and 'on-specification' fraction, which acts as a Refuse Derived Fuel (RDF) for cement kilns.

The flexibility of the industrial shredder means that Service Waste can process even more material streams in the future, if they wish, with the ability to achieve different alternative fuel specifications to suit varied off-taker requirements.

Service Waste maintains the UNTHA XR using internal resources but relies on UNTHA America for continued spare and wear parts.



***The existing XR was already processing more than double the volume of waste we'd first forecast, back in 2014, which saw us halve our landfill costs. But wear and tear is inevitable with such a workhorse. With the new, bigger XR, we've tripled our throughput, while halving our manpower requirements.***

***When we made the decision to invest in a new machine, returning to UNTHA was a 'no brainer'. Our criteria revolved around shredder durability, throughputs, uptime performance, operator safety, energy efficiency, and ease of maintenance. The XR ticks all the boxes – a testament to its strength and reliability.***

Robert Dunlap  
General Manager, Service Waste

## Project spotlight: Breitsamer, Germany

Founded in 1956, Munich-based Breitsamer Entsorgung & Recycling GmbH now processes approximately 200,000 tonnes of commercial waste, construction waste and recyclable materials per year.

Transforming construction and bulky wastes to produce an alternative fuel for the cement industry and heating plants, Breitsamer was on the lookout for a suitable shredding solution. Important criteria included energy efficiency, throughputs of 15–20 tonnes per hour, and a homogeneous output.

Following a long-term trial, the company opted for a stationary XR3000RC, which shreds approximately 35,000 tonnes of material per year. The integrated screening bars, placed at 155 mm gaps,

ensure a highly homogeneous output with an extremely low amount of excessive lengths. This makes the shredded material particularly suitable for subsequent processing steps and use as alternative fuel.

The RC cutting chamber was specially developed for the pre-shredding of different materials and for throughputs of up to 70 tonnes per hour. The unique tooth shape makes for a highly efficient material feed. The rotor of the XR3000RC runs with a low speed, making the shredder highly energy-efficient and extremely resilient towards non-shreddables. Hard facing of the rotor and stator blades is also possible, which means that the lifespan may be extended continuously.



Press play to  
see this plant  
in action





## Project spotlight: Renova Group, Brazil

In 2022, UNTHA IBÉRICA unveiled its collaboration with Brazil's industrial waste specialist Renova Group.

Renova Group is no stranger to the reuse, recycling and recovery of commercial and industrial 'waste'. The business has been collecting and treating varied materials – including metals, textiles, plastics, rubber and wood – for many years, with five industrial sites throughout the country, at the time of writing.

But passionate about investing in cutting edge technology to advance Brazil's waste handling capabilities – while minimising the environmental and fiscal impact of the process – Renova Group's CEO is always looking for continuous improvement.

The family-owned business therefore commissioned a single step RDF production line, enabling it to transform waste into a renewable

energy source, using only one shredding machine. An UNTHA XR3000C waste shredder now lies at the heart of the plant, producing a homogenous 50 mm fuel for the cement industry.

At the time of writing, the XR was processing 15 tonnes of material per hour, to suit Renova Group's requirements.

*"We quickly realised that the UNTHA XR would increase our RDF production capacity and give us more process flexibility, because the robust machine can handle a number of very difficult materials that prove too tough for most other shredders. But we also knew that the profitability of our operation would be further improved because the UNTHA XR is so efficient. Consuming up to 75% less energy than diesel hydraulic equivalent shredders, the fuel savings are vast. The machine is also easy to maintain, with little downtime, meaning general ongoing running costs are very affordable. In fact, our*

*operating costs have already fallen by 40%. All of this with such a small footprint, given a single shredder is all you need. It's very impressive!*

*Everything about this plant, has been designed with Renova Group in mind. Yes, the XR is very popular worldwide, but UNTHA IBÉRICA took its time to carefully understand our requirements and configure the shredder to suit our exact requirements.*

*This is proving to be a fantastic ongoing partnership – our operators work well with UNTHA IBÉRICA's customer service experts, ensuring our shredder is always in optimum running condition, and we have quick and easy access to spare and wear parts, when we need them. All of these factors matter when investing in shredding technology, and UNTHA ticks all the boxes."*

Eduardo Pirani  
CEO, Renova Group



## From the archives: Hazardous waste shredding in Portugal

In 2021, UNTHA proudly showcased a project in Setúbal, Portugal, where an UNTHA XR2000C shredder was installed in a €16 million hazardous waste treatment plant – the country’s only facility of its kind to offer a closed loop solution for difficult materials such as solvents, used oils and fuels.

The installation was for Carmona, a pioneer in the recovery and treatment of commercial, industrial and hazardous wastes, and an early industry leader in the handling of hydrocarbon waste.

The investment in an UNTHA shredder meant Carmona could begin to handle materials that would have previously been untreatable. And the resulting fraction – a homogenous 35 mm output material – is being used to produce RDF and SRF for national cement plants, to reduce the industry’s reliance on fossil fuels.

At the time of writing, Carmona was predicting a payback period of less than two years, for its XR investment.

*“We are continually investing in cutting-edge technology to ensure our business remains both efficient and progressive. When we heard about the capabilities of the XR, we had to see it in action and meet the people behind the machine. So, we travelled to UNTHA’s innovation centre, just outside Salzburg, to see what this shredder could really do. We were very impressed by its robustness and versatility. In fact, because it can comfortably handle a number of complex and abrasive wastes, with impressive throughputs, we knew it would be the only shredder we would require in our busy plant.*

*We can operate the XR with running costs*

*of less than €3/t including power and wear parts! I think this comfortably makes this the most efficient machine of its kind.*

*The XR also shreds everything – it seems to just eat up whatever solid waste we put in it! We can run three shifts per day, six days a week, giving us lots of capacity and the ability to become a ‘one stop shop’ for customers. As businesses in Portugal look for closed loop solutions, this flexibility is crucial. It’s no good simply being able to recover the ‘easy’ materials – otherwise we’d never achieve the environmental progress the country is striving for.”*

Vitor Carmona  
Managing Director, Carmona

## Polcopper produces cement fuel in Poland

Scrap metal specialist Polcopper, based in Kościan County, Greater Poland, has invested in UNTHA shredding technology as the increasingly multifaceted business expands its production of Refuse Derived Fuel (RDF). Customers include recycling businesses as well as cement kilns throughout the country.

*"This is state-of-the-art shredding technology, which operates with an energyefficient slow speed, without any detrimental impact on our throughputs. It is safe and simple to operate, quick and easy to maintain, and has very low wear rates – this keeps running costs low while ensuring we keep shredding!"*

Piotr Rusiecki  
Owner, Polcopper





## Contributor thanks

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This report has been authored by a number of alternative fuel production specialists from UNTHA's global team, including:

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