









**KOLINA<sup>®</sup>**

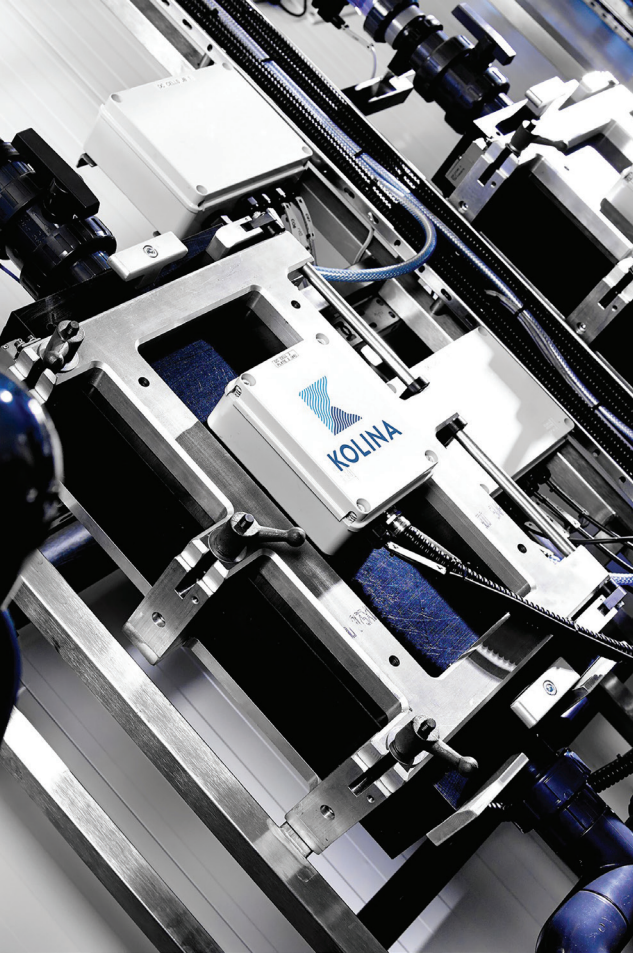
## SECTOR BREAKTHROUGH REPORT

**Major UK metal reclamation site**  
adoption of Kolina's proprietary  
Electrocoagulation Technology ("KEC").

Following extensive trials at a major UK metal reclamation site<sup>1</sup>, Kolina's KEC units have proven the capability to:

-  Replace off-site tankering with **direct discharge under EA consent**
-  Release up to **£0.5m annualised OPEX savings** on a c50-acre site
-  Reduce out of consent **Suspended Solids** by **>80%** to below **30mg/l**
-  Keep **Total Petroleum Hydrocarbon and Metals** within discharge consents
-  Deliver up to **90% reduction of CO<sub>2</sub> footprint & H<sub>2</sub>O usage**
-  Offer more comprehensive **outcomes than adsorption & media**

This has led to adoption of KEC by an industry-leading UK metal recycling company as part of its efficiency & sustainability programmes.



# 1

## Proprietary Technology

Kolina's KEC combines its patented electrocoagulation technology with proven solids removal techniques to create a unique packaged treatment plant. The modular plug-and-play units are fully automated, supporting real-time monitoring and ease of operation. They have been designed for rapid installation, simply requiring a flat surface, 3-phase power and mains water.

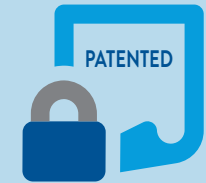
Cell design and technical configuration allow single-user electrode replacement (under 2 minutes), lower energy consumption (from 0.15 kWh/m<sup>3</sup>), and a patented control philosophy to prevent electrode passivation (ensuring 100% plate use without intervention). A sophisticated control system supports remote monitoring, which significantly reduces operator intervention.

### KEC vs. Traditional Alternatives

The preferred route for managing contaminated run-off water from metal recycling sites is to discharge to the local watercourse. As the EA has imposed increasingly stringent discharge consents, the industry has experimented with various techniques to remove (heavy) metals, TPH, COD, and suspended solids to within consented concentrations; but none have proved entirely effective. The challenges and limitations of each have resulted in operators having to resort to tankering effluent off-site. This is expensive, environmentally inconsiderate and carbon-intensive.

**KEC is an accessible, comprehensive and efficient technology proven to bring run-off effluent from metal recycling sites to within EA discharge consents.**

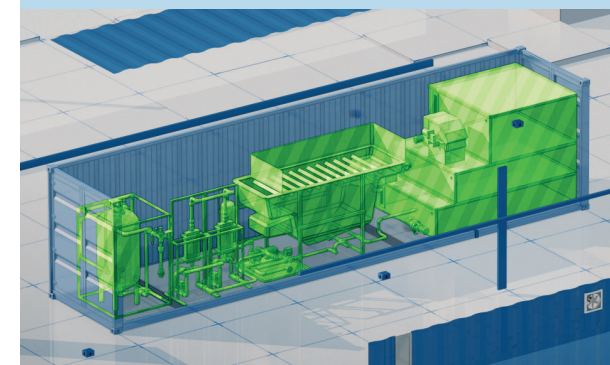
	KEC	Carbon adsorption	Media filtration
Remove solids	✓	●	●
Remove oils (TPH)	✓	✗	✗
Remove metals	✓	●	✗
EA Compliance	✓	●	✗
Ease of operation	✓	✗	✗
Carbon/Water footprint	✓	●	●



**No-energy** Patented solution to Electrode Passivation



Quick and easy to deploy and operate





## 2

# Proven Capability

Kolina's KEC technology has proved to be a valuable alternative to effluent tankering and other techniques for treating wastewater to meet EA permits.

Our patented technology has been rigorously tested and recognised by regulators, test networks and water companies, including the prestigious Ofwat Water Breakthrough Challenge. This recognition underscores the credibility and effectiveness of Kolina's innovative solutions in the water industry.

KEC has now proved to effectively remove a wide range of determinands, including metals, TPH, and COD, from metal reclamation, onshore drilling, fracking, and mining activities.

For our test metal recycling site, KEC technology successfully demonstrated its ability to treat the wastewater to consistently achieve the following discharge consent:

- Suspended Solids (30 mg/l)
- Total Petroleum Hydrocarbon (5 mg/l)
- Total Cadmium (0.01 mg/l)
- Total Copper (1.5 mg/l)
- Total Lead (2.5 mg/l)
- Total Zinc (2 mg/l).

Removal efficiencies of up to 92% for Suspended Solids, 93% for Total Petroleum Hydrocarbon, and 80% for Metals were achieved, ensuring the treated effluent could be safely discharged to the nearby water course with EA consent.

**Kolina's unique containerised effluent treatment system integrates proven solids separation techniques with its patented electrocoagulation (KEC) technology to create a superior multistage treatment solution.**

## 3

# Value Add

The KEC trial on a c50-acre metal recycling site, suggests availability of net OPEX savings of up to £500k p.a. This is made up of a number of factors, including elimination of off-site tankering and re-use of treated effluent for dust suppression, and would equate to a payback of less than 10 months.

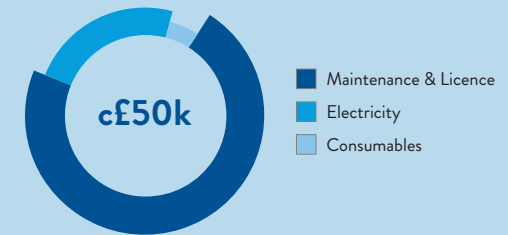
High quality of the treated effluent offered the site the option to use it to spray the yard daily for dust suppression as a direct replacement for fresh water. This yard previously used c25,000 litres of fresh water per annum.

With the EA actively enforcing stringent discharge consents for the sector, the cost of managing surface effluent from metal reclamation sites is likely increase further.

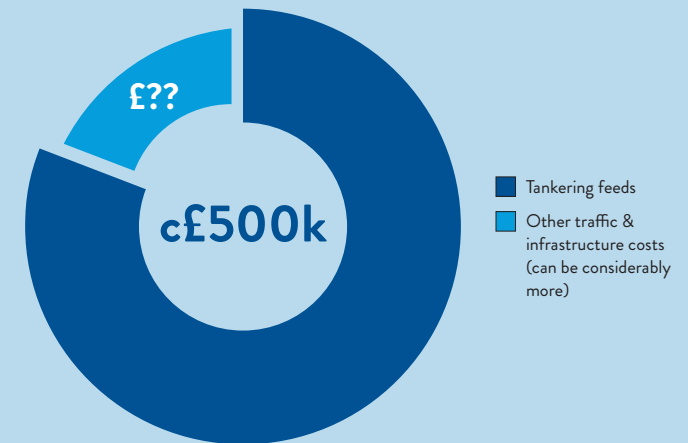
**KEC offers significant financial benefits by eliminating tankering of effluent, re-use of water for dust suppression and future proofing against escalating cost of compliance.**

# OPEX reduced by up to 90%

## KEC Technology – annual OPEX



## Off-site tankering – annual OPEX



# 4

## Sustainable & Resilient

The embodied and operational carbon footprint benefits of Kolina's technology are significant when compared to the alternatives. There is scope to improve on this further as the electric grid is decarbonised with increasing use of renewable sources.

Annual carbon emissions associated with the KEC plant were calculated to be up to 90% less than that from offsite tankering. The current c125 tonne CO<sub>2</sub> p.a. emissions from the existing 50-acre site were largely due to the high carbon intensity of fossil fuel used by the tankers<sup>2</sup>. Treating and discharging the effluent at source also reduces vehicular traffic and associated noise pollution which negatively impact communities, particularly in rural locations.

Regarding alternative treatments, spent carbon media is either incinerated, landfilled or, at best, regenerated for further use. Thermal regeneration is the primary process, with high associated operational carbon emissions, as the media is heated to up to 900°C<sup>3</sup>. The lack of readily available industrial carbon regeneration furnaces means only a fraction of spent carbon ends up in landfills, thus transferring the adsorbed contaminants back to the environment via landfill leachate.

**KEC is a lower carbon footprint alternative helping to deliver your sustainability and net zero commitments.**



Up to 90%  
carbon saving



NO  
tankering



Allows 100%  
water re-use

# 5

## Breakthrough Innovation

Our unique patented technology ("KEC") offers a more sustainable, effective, and lower-cost alternative to off-site effluent tankering with lower carbon footprint and other advantages over alternative technologies

It also delivers high removal efficiencies for COD, TSS, TPH, and metals compared to other available treatment solutions.

**If you would like to explore what KEC can do for you, contact us via [info@kolina.co.uk](mailto:info@kolina.co.uk) or speak directly with our Technology Specialists on +44 7572 536327. We'd be delighted to help.**

- <sup>1</sup> c50-acre metals recycling facility managing up to 3,500m<sup>3</sup> surface runoff effluent per month.
- <sup>2</sup> Assumes 50-mile distance from site to point of discharge of tankered effluent. Operational carbon after discharge is not included in the calculation.
- <sup>3</sup> R. Ganjoo, S. Sharma, A. Kumar, and M. M. A. Daouda, in *Activated Carbon Progress and Applications*, ed. C. Verma and M. A. Quraishi, The Royal Society of Chemistry, 2023, ch. 1, pp. 1-22.



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