Your partner for energy-efficient AFR shredding

M&J RECYCLING

With you all the way

M&J RECYCLING

Presenter

Jens Vestergaard Nielsen
Chief Technology Officer

M&J RECYCLING

With you all the way

RDF: An effective way to lower the CO2 footprint of cement production

High-performing M&J shredders are at the heart of RDF production and deliver significant energy savings

- EHJ Energi produces high-quality refuse-derived fuel for use at the Danish cement company, Aalborg Portland
  - 53% of fuel used in Aalborg Portland's production of grey cement comes from alternative fuels*
  - EHJ production: 100 tons RDF per day
- M&J shredders are a vital component in EHJ's RDF production
  - Implementation of e-drive fine-shredder provided 25-30% energy savings
  - Reliable and stable size-reduction
  - Homogenous, high-quality output

*: Our idea of the future | Aalborg Portland Holding A/S

Quality RDF production based on M&J shredders

Updating the existing RDF line with new M&J pre- and fine-shredders increased Pena's production capacity and RDF quality

- Pena has produced RDF for the cement industry for more than 15 years
- New shredders in their RDF production line:
  - M&J P250 / 4000 pre-shredder
  - M&J F210 fine-shredder
- Total output: Increased to 20-22 tons/hour
- Consistently high-quality RDF

M&J RECYCLING

AFR pre-processing & co-processing

M&J Recycling as key supplier for AFR treatment equipment

With you all the way

- Market leaders within innovative **high-performance shredders** (Primary)
  - The most complete pre-shredder program on the market
  - Innovative solutions providing significant energy savings
  - Reliability and durability as our main DNA

- Key supplier of **high-performance fine-shredders** (Secondary)
  - Unique cutting technology
  - Low energy consumption per ton production
  - Easy to maintain

M&J RECYCLING

Market leading product portfolio

Focus on **lowering energy consumption** through innovative solutions

Stationary pre-shredders

Superior performance – up to 200 t/h:
Open cutting table. Unique cutting technology. Bi-directional shredding.

Unique versatility – different waste types/applications:
Unique cutting technology. Dedicated/selectable knife types and numbers.

Exceptional durability – proven and robust design and components:
Advanced design. Wear-resistant materials.

Unbeatable reliability – excellent uptime:
Advanced design. Wear-resistant materials. Knives welded on shafts. Easy maintenance.

Highly competitive OPEX / (TCO):
Robustness – less service. Easy maintenance. Wear-resistant materials.

Stationary fine-shredders

Powerful performance – up to 28 t/h:
Leading cutting technology and cleverly designed rotor. Intelligent pusher system.

Low operating expense:
One of the most competitive OPEX in the industry (up to 35% lower)

Less power for installation:
Low total installed power kW (up to 20% less)

Low operational cost:
Low operational energy costs kW/h (approx. 20% less)

Easy maintenance:
Resistant to wear. Easy to service via a service hatch.

M&J RECYCLING

With you all the way

GUARANTEE FOR A PERFECT MATCH

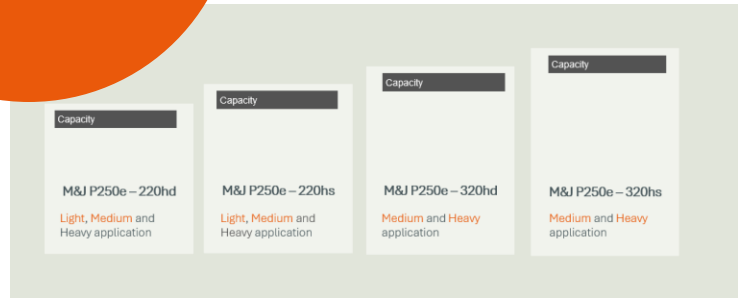
Heavy-duty applications or lighter waste streams? There's an M&J P250e for every single requirement.

M&J P250e: Raw power, no matter the task

M&J Recycling's flagship pre-shredder

- Draws on the development of the e-drive and the proud traditions of the M&J 4000S.
- Sets a new standard:
  - Performs just as well - or even better - than its hydraulic sibling.
  - Significantly reduces CO_2 emission.
  - Designed for all waste applications.
  - Broadest offer on the market regarding drive train power, CT knife type options and CT knife numbers.
  - Significantly improved operating cost and reduced carbon footprint with equal or higher output capacity.
  - Modular design

The highest capacities in the market!



M&J P250e

Why choose e-drive?

Up to 50% lower operational energy consumption compared to hydraulic drives

- Less transmission loss compared to hydraulic drive
- Special energy-saving features – effective on all waste types/applications
- Energy savings = lower OPEX = higher profitability
- Lower energy consumption = improved carbon footprint = reduced CO_2 emission = improved ESG

Lower noise emissions from the shredding operation

- Due to the lack of pumps and other components the noise emissions from the e-drive unit are up to 10 dB(A) lower than its hydraulic counterpart

Lower environmental impact due to oil spillage

- Less oil used = minimized oil spillage
- Minimum potential fire hazard due to oil spillage

M&J P250e

What makes the 50% energy saving possible?

Energy-efficient and sustainable solutions are the core of our product design

ReCapture

- Energy recovery system developed by M&J in cooperation with the leading global manufacturer of frequency converter units
- Reuses the rotation energy stored in shaft A to power shaft B during the change of direction of rotation
- No energy spikes / “kick-back” to external power grid

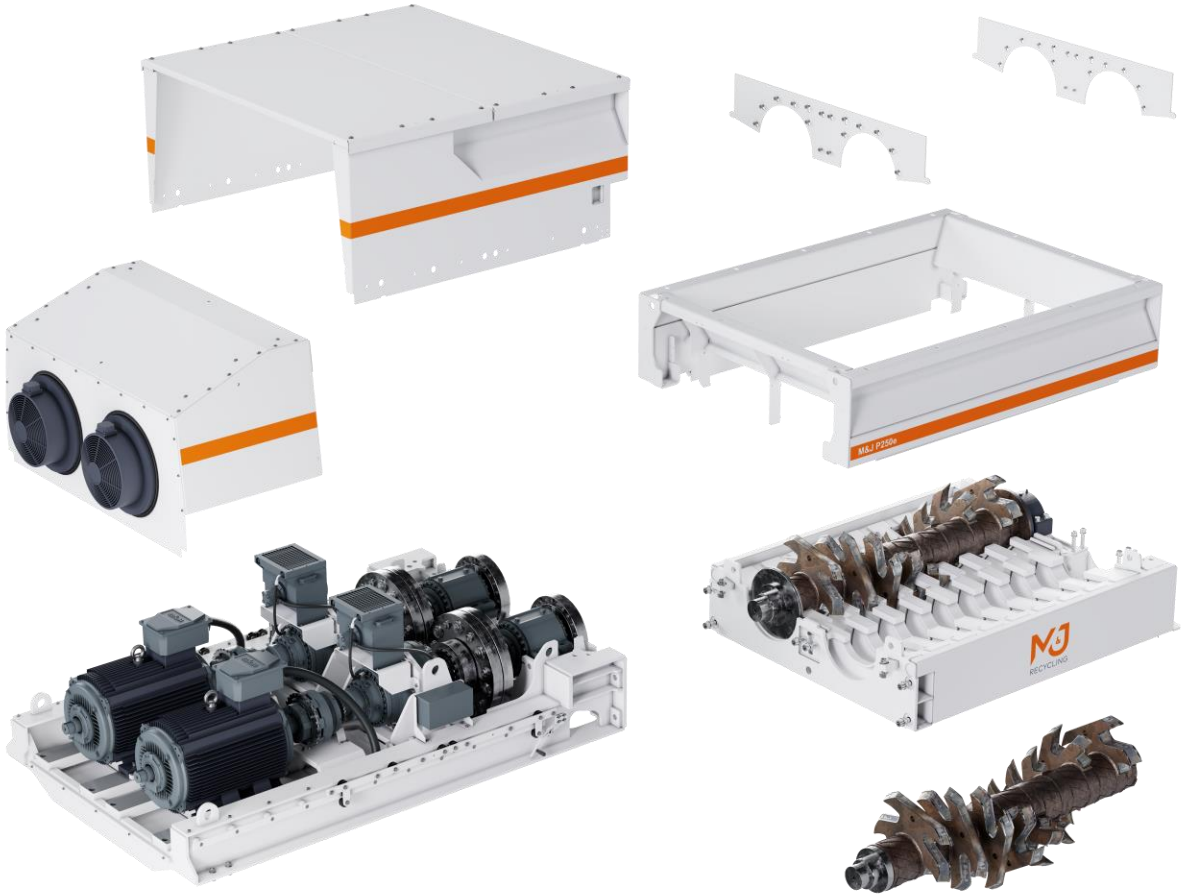
The electrical drive system has minimum transmission losses compared with other drive systems.

The base energy necessary for the electrical drive system to operate is significantly lower than for a hydraulic system.

M&J RECYCLING

Modular design = lower OpEx

Easy disassembly for quick and easy maintenance



LESS IS MORE

Welcome to savings in operational energy consumption

e-drive fine-shredders

F320e

F240e

RECYCLING

Designed for high-capacity production

PERFORMANCE

Delivers up to 28 t/h (F320e) and up to 17 t/h (F240e)

- Leading cutting technology and cleverly designed rotor
- Reliable and easy to monitor
- Highly efficient shredding of all qualified material
- Can be programmed for various types of material

Up to 35% lower energy consumption than the closest competitors

SERVICING

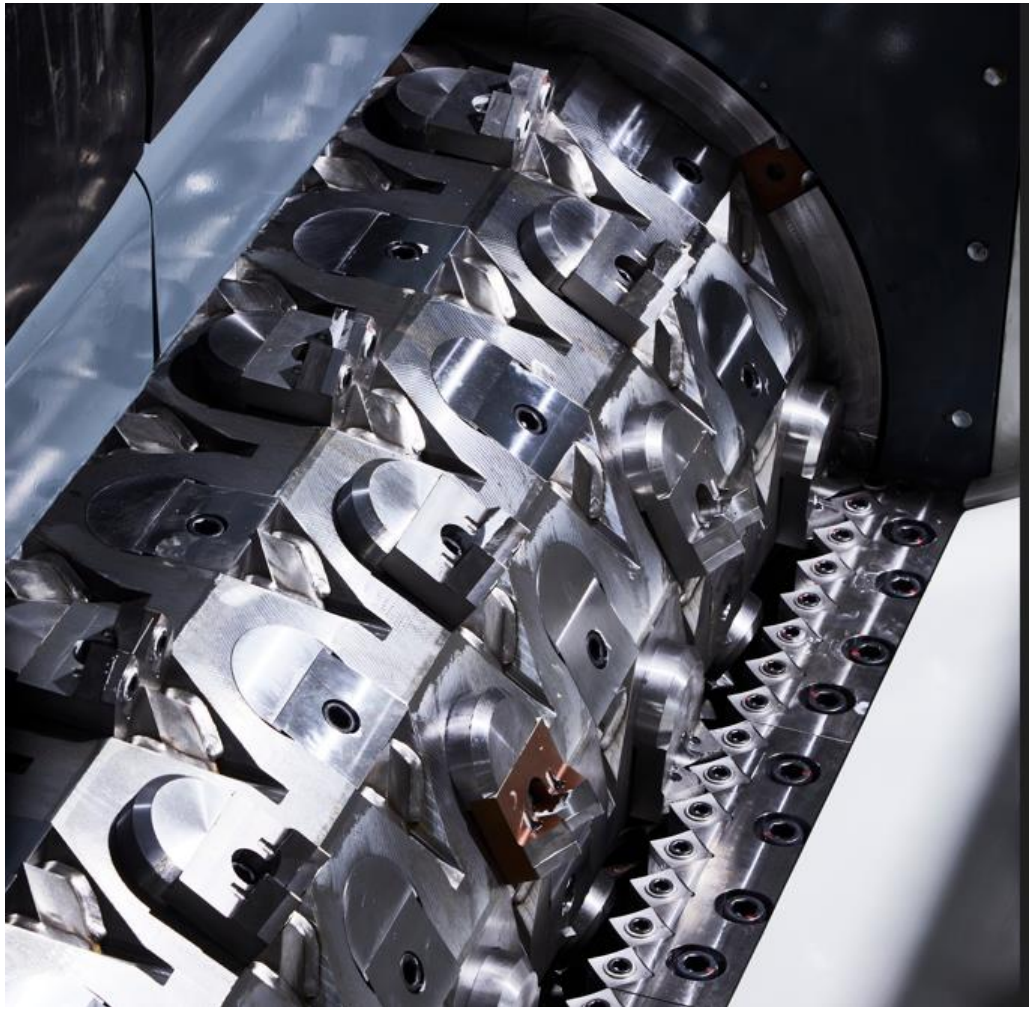
Thoughtful design makes service easy

- Unique cutting technology enables quick and efficient daily maintenance for minimum downtime
- Easy adjustment of the belt drive tension and quick exchange of the drive belt
- Fast delivery and replacement of standard spare parts – often from day to day
- Monitor sensors on key components secure safe and “stop free” operation
- Preventive maintenance through *My M&J Performance*

F-series shredding unit

Multi-edged rotor

- Minimal friction
- Low heat generation at the shredder rotor (M&J: 5-15°C, Others: 30-40°C)
- No external cooling needed



M&J RECYCLING

Thank you for your attention

Jens Vestergaard Nielsen
CTO

www.mjrecycling.com

M&J RECYCLING