Norwegian ALSO boasts the world’s only fully automated waste sorting plant – an evolutionary process. For instance, in the past there would have been one or two TOMRA (also a Norwegian company) sensor sorting machines on the sorting line, whereas in the automated plant, you need at least six."

Originally designed with a processing capacity of 30 tonnes per hour (tph) of MSW, the Skedsmokorset plant has already undergone an expansion in October 2015 to increase its capacity to 40tph. "The plant was originally designed to have 15 years of growth, but after starting operations, we identified bottlenecks and decided to increase the capacity," recalls Brevik.

The site at Skedsmokorset includes a landfill. "Only 1% of household waste in Norway goes into landfill," explains the director. "Ours is a natural turbine and doesn’t need a double skin to cover it.

Procedure
Two streams of materials are delivered to the plant in each waste collection lorry; organic waste arrives in green bags along with the residual waste. Metals are removed along with plastic and mixed paper (“We don’t want paper mixed in as you get a better price for good-quality paper,” comments Brevik). Great emphasis was placed in the plant’s design on the sensor sorting machines’ ability to distinguish between the green bags containing organic waste from green carrier bags, so they can be diverted at an early stage of the system to the site’s anaerobic digestion plant.

Besides the automatic separation of green bags from the waste stream for further AD processing, the predominant objective is the separation of recyclable materials such as polymers, paper, wood and refuse derived fuel (RDF)/mixed plastics from all waste streams for further recycling. The separation of organic waste into green bags ensures the rest of the waste and recyclable materials are not contaminated. In its drive to achieve a virtuous cycle, all RoAF’s waste collection vehicles run on biogas produced from their AD plant. "You can see it on the number plates whether the vehicles are fuelled by hydrogen (H2) or biogas (GA),” explains the administration director. The digestate produced by the AD plant and used as compost is also a bonus. “We have clay soils here so free compost for the public is most welcome," jokes Brevik.

The 6,000 square metre building holding the automated facility is also unique. The waste sorting plant uses more than 300 tonnes of steel and 1,300 square metres of walkways, covers six floors and in some places reaches 15 metres in height.

"It was one of the most interesting buildings to work in, especially the way we had to use the building in creative ways, including feeding conveyor belts through the roof structure,” recalls Brevik.

No wasted space
Brevik adds: “One of our priorities was to use all the available height. It’s cheaper to build a small building and saves on heating costs in the winter time. Smaller rooms are better for the environment.”

The process for waste arriving at the plant is as follows:
- Waste reception
- Sorting of green bags – Line 1
- Main sorting line with separation of paper – Line 2
- Polymer – sorting – Line 3
- Recovery of metals
- Bunker belts, bailing and loading

An unusual aspect of the facility’s design is that cabling and compressors are in a separate part of the recycling plant so that it remains in a dust-free environment.

"One of the major advantages to the plant’s automated facility is the fact that it only requires two operating staff to load the waste and remove the bulking materials – there is no manual sorting. The rest of the operation is monitored and controlled by closed-circuit television,” says Brevik proudly.

"Clever design details make the running of the plant as problem-free as possible, such as large doors on the crates giving access to the operatives, so that at the end of each shift, items like VHS tapes, which get snagged onto the drums, can be removed. This ensures that maintenance can be carried out smoothly and in a short space of time and it’s possible.

Not only is there cooperation between the designers of the plant and its operation team, but also the partnership between RoAF and its residents. According to the waste management contractor, the plant relies on the community sorting out their material correctly.

Among the key partners in the waste sorting plant is TOMRA, a world leader in sorting equipment.

Norwegian kroner (£18.5 million) to build, took three to four years from concept to completion and was constructed in a mere three months by STADLER Engineering.

RoAF is an inter-municipal waste company that looks after 10 Norwegian municipalities. These consist of Aurskog-Holand, Enebakk, Fet, Gjerdum, Lorenskog, Nittedal, Rælingen, Skedsmo, Sørum and Rømskog. Populations in each municipality vary, from 620 residents in Rømskog to larger municipalities such as Skedsmo, which boasts 53,000 people.

"We are responsible for the collection of household waste in these municipalities and serve 190,000 inhabitants. Altogether we handle 104,000 tonnes of waste (75% of which is household waste) and also operate the Balder landfill and eight recycling stations, as well as make arrangements for the collection of hazardous waste. In total, we have over 80 employees and a turnover of around 200 million Norwegian kroner,” says Espen Brevik, RoAF’s administration director. He pauses before adding modestly: “In the Norwegian market, we are a big player, but in the world we are relatively small.”

Norway operates a three-container waste collection system: one for food waste in specially designated green bags, plastic and residual waste, the second for paper and cardboard; while the third takes care of glass and metal packaging. There is also a red bin for WEEE and hazardous waste.

With progress on the automated facility being keenly monitored, Brevik admits RoAF is already coming under pressure from other waste management companies and municipalities to take their waste.

"We have 10 companies that want us to take their waste, but we are asking for time to ensure the plant works to our satisfaction.”

So what technology is to be found in the automated facility? “It is a well-known technology, but put together in a new way,” explains RoAF’s administration director. In total, the equipment comprises:
- 16 NIR machines
- Two drum screens
- Two bag openers
- Two ballistic separators
- An eddy current
- Overband magnets
- One vibrating screen
- A shredder
- A windshifter
- A star screen

“One of the important criteria for the facility and an indication of where the market is going is that it should not include any picking lines,” says Trevor Smart, international sales manager with German waste and recycling engineering specialist, STADLER, which supplied the Norwegian market.

It may be more famous for the Vikings and Edvard Munch, but Norway also boasts the world’s only fully automated waste sorting plant – perhaps not surprising for a country where only 1% of household waste goes to landfill. Geraldine Faulkner reports

CASE STUDY: NORWAY

Waste in Norway

- In Norway, waste volumes have increased by more than 50% since 1995. As much as 81% of non-hazardous waste is recovered, and 97% of hazardous waste is collected.

- Norway generated 11.2 million tonnes of waste in 2013. This was an increase of 5% from the year before. Household waste comprises an increasingly bigger share of the total – 25% in 2013.

- Of the non-hazardous waste recovered in 2013, material recovery comprised 34%, while energy recovery accounted for 36%.

- The amount of degradable material going to landfill has dropped, partly due to a ban on the landfilling of biodegradable since 2009 and partly due to the increased export of waste to Sweden for incineration.

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