

# RETURN

RECYCLING NEWS FROM TOMRA

Combating  
Climate Change

Mobilizing a  
new green economy



**TOMRA**  
Helping the world recycle

02 / 2008

KEEN TO BE GREEN  
Students opt for greener schools

GROUNDBREAKING WASTE TEST  
TiTech trial extracts value out of residual waste

SORTING TECHNOLOGY ACQUISITION  
UltraSort and Commodas join forces



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COVER PHOTO: Britt Erlanson, Getty Images



RETURN is published twice a year, June and December, and is distributed to TOMRA's employees, customers and other interested parties worldwide.

An electronic version is also available on TOMRA's website: [www.tomra.com](http://www.tomra.com)

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LAYOUT: Helene Solheim  
PRINTED BY: RK Grafisk  
PRINTED COPIES: 5,500

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RETURN is printed on Satimat Green, a paper produced from 60% recycled fiber and 40% FSC (Forest Stewardship Council)-approved virgin fiber. It was printed using a Nordic Ecolabel-approved printer, following the industry's highest environmental, quality and health standards.



The year 2008 is soon coming to an end. A short summary of the year shows that within our Collection Technology Deposit segment we installed close to 5,000 RVMs, including some 700 UNO machines. TOMRA now has close to 65,000 machines installed around the world, a tribute especially I think to the great level of service provided by our field force.

Our Materials Handling operations in the US have had a challenging year, first with high fuel prices and more recently with decreasing commodity prices. Despite these challenges, we have managed to expand our collection centers in California and increase our market share of the collected volumes in this market by about 10% during the year.

All of the companies within the Industrial Processing Technology segment have shown strong revenue growth, clearly demonstrating that the solutions they provide are in high demand from both new and existing customers. In this segment we also concluded the acquisition of UltraSort, a company whose technology and operations will complement very well our existing material sorting activities within the mining sector. The benefits our sorting technology can provide to this industry are significant, both financially and environmentally.

In the Collection Technology Non-Deposit segment we have expanded installations into new markets and Tesco is continuing the roll-out of our Automated Recycling Center (ARC). As we now feel that the technology developed for the ARC is at a satisfactory level, the product can be transitioned from a heavy R&D focus to an engineering phase. Consequently we restructured our R&D activities in Asker in the third quarter, and together with other adjustments we expect this to yield a cost reduction effect of 60 million Norwegian kroner in 2009.

Looking at our operations from an environmental perspective, our solutions around the world are collecting 30 billion beverage containers, processing 300,000 tons of containers, sorting eight million tons of valuable commodities and compacting about 30 million tons of waste - all of which is recycled. In this regard, we estimate that our solutions are helping to save about 10 million metric tons of CO<sub>2</sub> each year - an amount equivalent to about 20% of the total CO<sub>2</sub> emissions produced by Norway.

Over the last couple of months the financial and business environment and framework has changed dramatically. Some businesses and industries have come to a standstill and the financial system is not working prop-



erly. This will of course also impact our company, but very differently from business area to business area and stronger in some markets than in others. As a company, TOMRA is very well positioned to handle the upcoming challenges. Both from a financial point of view and from an industry segment and market position point of view. For all of us the main priority is to stay focused on the opportunities and daily challenges.

The environment has moved prominently forward on the agenda around the world. So far it looks like the green movement is not being sacrificed due to the current financial challenges. In fact, all indications suggest there will be an increased investment on green initiatives and technologies in an effort to re-tool the economy for future growth and fight global warming at the same time.

By focusing on our company values - thinking innovatively, acting responsibly and showing passion for our work - I am sure that our company will be able to look back a year from now satisfied that we have delivered great value to our customers and the environment.

Best wishes to all for a Merry Christmas and a Happy New Year.

Amund Skarholt, President & CEO

## Coop Denmark takes donation capability nationwide



By installing the option to donate deposit refunds to charity on all 1,200 of its reverse vending machines across the country, Coop Denmark has become the first national food retailer to go nationwide in implementing this functionality provided by TOMRA.

This capability makes it possible for Coop Denmark's customers to donate all or part of the deposit refund amount due to them after returning empty containers at any Coop store. The donations go to the two charities supported by Coop Denmark, UNICEF Denmark and DanChurchAid (Folkekirkens Nødhjælp). In October, the first full month that all machines were equipped with the donation button, Coop customers donated through the machines a total of 670,000 DKK to the two charities.

Participation is completely voluntary. In order to donate a deposit refund, customers must first push a separate donation button and then confirm their choice to donate by pushing the button again. Customers also have the opportunity at this point to decide whether to donate the whole refund or only part.

*All of TOMRA's current reverse vending machine models can be outfitted with the donation capability. Contact your local TOMRA sales office for more information.*



## Labor of love

British couple takes recycling to new heights using TOMRA machines

When John and Ann Till from Petersfield, UK began looking for ways to help fund their honeymoon in August, they decided to embark on a rather unique labor of love. Seeing that the recycling machines at their local Tesco supermarket would give them one Tesco Clubcard point for every four items recycled, they figured out that if they picked up enough litter they could recycle it using the machines and convert the Clubcard points to air miles on British Airways.

After three solid months of collecting and recycling thousands of bottles and cans, the Tills reached their goal: enough points to convert to 36,000 air miles, which they used to fly back in business class from their honeymoon in the United States.

TOMRA's automated recycling machines can be found at numerous Tesco supermarkets in the UK. For a current list of these locations, visit [www.tesco.com/greenerliving/tesco\\_recycling\\_centres.page](http://www.tesco.com/greenerliving/tesco_recycling_centres.page).

## TOMRA RVMs used for aluminum profiling campaign

Hydro, the world's third largest integrated aluminum supplier, purchased eight TOMRA reverse vending machines earlier this year to use as part of an innovative branding campaign in Norway and Germany.



The campaign, designed to highlight aluminum as a highly versatile and infinitely recyclable material, was developed as a traveling exhibition which utilized the TOMRA machines as an integrated component. The machines were utilized at exhibitions at two of Norway's largest universities in Oslo and Trondheim, as well as at the aluminum trade fair Aluminium 2008 in Essen, Germany.

The exhibitions at the Norwegian universities featured an information corps dressed in aluminum jackets and Hydro hardhats, promoting the overall message "infinite ideas in aluminium." Central to the campaign was a "Hydro brand" of canned water, a giveaway developed especially for the exhibitions. Printed with various slogans such as "I'll Be Back" and "Forever Young" the giveaways were an effective medium to reinforce the recyclability of aluminum message. The TOMRA machines were also tied in as well, with Hydro donating one Norwegian krone to the charitable organization Save The Children for every can returned using the eight campaign machines. The cans were also programmed into the national deposit return programs, both in Norway and Germany, so that any cans not returned at the exhibitions could instead be returned at any other machine to receive the standard deposit refund for cans.



# Tomra Nordic boosts efficiency with new ERP system

## in Sweden, Norway, Denmark and Finland

Providing real-time accessibility to a wide range of logistical data, Tomra Nordic's new enterprise resource planning (ERP) system will help to increase the efficiency of its business processes and in turn provide faster and more proactive service to its customers.

The new ERP system, provided by IFS, was selected after a review of 10 potential suppliers. Implementation began first with a pilot installation in Sweden, and after this was approved and fully up and running, a sequential rollout to the rest of the Nordic markets began at the end of 2007. The full rollout across Tomra Nordic was completed in November 2008.

According to Fredrik Nordh, Director of Finance for Tomra Nordic, "for TOMRA, providing best-in-class service is a key component to the value proposition we offer our customers. And with over 17,000 installations in the Nordic region, having an efficient and easy to use resource planning system is very important to being able to provide this level of service. Although the data management systems we had previously were sufficient as independent systems, we recognized we could provide even better service by integrating to one common system with a single database. This opens up a number of operative benefits across the business with regard to accounting, billing, supply chain, etc. We

are very satisfied with the result we have achieved, as well as the excellent help we received from IFS during the implementation process."

**Real time:** Tomra Nordic's service technicians interface directly with the ERP system during their workday via onboard vehicle PCs, providing a real-time overview of all service records and resources.



### ABOUT IFS

IFS is one of the world's leading providers of component-based business software. Since 1983, IFS has been a provider of business applications focused on meeting the needs of selected industries. Today, IFS operates in two areas: lifecycle management, where asset and product lifecycle management are critical issues, and midmarket ERP, which covers distribution and manufacturing in midsize companies. See [www.ifsworld.com](http://www.ifsworld.com) for more information about the company.



## Keen to be green

For today's generation of students entering institutions of higher learning, the extent to which a university is engaged in environmental efforts has become an important factor in determining which school they ultimately choose to attend.

In a survey this year of 10,300 college applicants and parents of applicants by The Princeton Review, 63% of respondents said they value having information about a college's commitment to the environment. Of these, 23% said such information would "strongly" or "very much" impact their/their child's decision to apply to or attend the school, with a higher percentage of students (24%) than parents (18%) expressing this opinion.

The Princeton Review, an organization that provides services helping students choose and get into colleges (which has no affiliation to Princeton University), has also introduced this year a new "Green Rating" of colleges. The Green Rating for 2009 released this summer is based on data collected from 534

### The Princeton Review's "2009 Green Rating Honor Roll"

Congratulations to the 11 colleges that each received Green Rating scores of 99 (the highest score):

- Arizona State University at the Tempe campus
- Bates College (Lewiston, ME)
- Binghamton University (State Univ. of New York at Binghamton)
- College of the Atlantic (Bar Harbor, ME)
- Emory University (Atlanta, GA)
- Georgia Institute of Technology (Atlanta, GA)
- Harvard College (Cambridge, MA)
- University of New Hampshire (Durham, NH)
- University of Oregon (Eugene, OR)
- University of Washington (Seattle, WA)
- Yale University (New Haven, CT)

## Keen to be green (cont.)

colleges and universities in the 2007-08 academic year concerning their environmentally related policies, practices, and academic offerings. The criteria for the rating cover three broad areas: 1) whether the school's students have a campus quality of life that is healthy and sustainable; 2) how well the school is preparing its students for employment and citizenship in a world defined by environmental challenges; and 3) the school's overall commitment to environmental issues. The institutional survey for the rating included questions on everything from energy use, recycling, food, buildings, and transportation to academic offerings (availability of environmental studies degrees and courses) and action plans and goals concerning greenhouse gas emission reductions.

According to Robert Franek, Vice President and Publisher at The Princeton Review, "The green movement on college campuses is far more than an Earth Day recycling project or a dining hall menu of organic food. The commitment that many colleges and their student bodies have made to environmental issues—indeed, to the environment—in their practices, use of resources, and academic and research programs is truly compelling. We are pleased to play a role in helping students identify, get into and study at these schools. It is the students of today who will face, and hopefully find solutions for, the enormous environmental challenges confronting our planet's future."

With the increasing green movement at college campuses across the country and indeed around the world, the interest in establishing more effective recycling programs is also on the rise. Says Warren Stoll, Vice President Sales and Marketing at Tomra North America, "we applaud the efforts of universities that have undertaken substantial green initiatives. And we believe that when it comes to recycling, these efforts can be made significantly more effective and efficient through the introduction of technology-based collection platforms. TOMRA has developed an automated container return solution that is perfectly suited for colleges and universities, and we are working now to get our message out as to how this solution can help them both improve and raise awareness about their recycling efforts."



***"We applaud the efforts of universities that have undertaken substantial green initiatives. And we believe that when it comes to recycling, these efforts can be made significantly more effective and efficient through the introduction of technology-based collection platforms."***

## The benefits TOMRA UNO can provide to schools and universities:

### Improve green efforts and image

- › Dramatically increase the recycling contribution of your school/university and reduce the amount of waste generated
- › Earn a reputation as a green school/university by adopting state-of-the-art recycling technology

### Earn extra advertising dollars

- › Invite sponsors to advertise on the machines or sponsor couponing programs for students

### Reduce clean-up efforts and littering

- › UNO will reduce the need for emptying trash bins as beverage containers, which account for up to 50% of the volume in a typical trash bin, will be diverted
- › Littering will be dramatically reduced as students will find recycling both convenient and rewarding

## Examples of other UNO applications:



Convenience store



Sports arena



Gas station



Concert arena



National park



Integrated with vending machine

Visit [www.uno.tomra.com/usa](http://www.uno.tomra.com/usa) for more information.

# Combating Climate Change

The call to mobilize a new green economy grows stronger

The evidence is incontrovertible: global warming is indeed happening, and at an alarmingly rapid rate. According to data from the Intergovernmental Panel on Climate Change (IPCC)<sup>1</sup>, 11 of the past 12 years (1995-2006) rank among the twelve warmest years in the history of recorded global surface temperature (since 1850). Global average sea level is also on the rise, increasing since 1961 at an average rate of 1.8 mm/yr and since 1993 at 3.1 mm/yr.

It is clear that the cumulative effects of man-made emissions of greenhouse gases are causing these changes. Global greenhouse gas (GHG) emissions due to human activities have grown since pre-industrial times, and particularly within the last 30 years, with an increase of 70% between 1970 and 2004.<sup>2</sup>

## Tipping point: 2° Celsius

The IPCC projects that, without additional substantive actions beyond current mitigation policies and related sustainable development practices, the global average temperature is likely to increase further by 1.8°C to 4°C this century. The general scientific consensus suggests that global warming of more than 2°C by 2050 would have potentially catastrophic and irreversible consequences. According to an analysis by the European Commission, for the world to have a fair chance of keeping the average temperature rise to no more than 2°C, global emissions



Environmentalists call for action to reduce waste during a street protest in Manila on December 1, 2008. The protest was held to coincide with the opening of the United Nations Climate Change Conference in Poznan, Poland as thousands of government officials, civil society advocates and other participants from different nations gather to negotiate a new climate change treaty. (Photo: AFP/SCANPIX)

of GHG will have to be stabilized by around 2020 and then reduced by up to 50% of 1990 levels by 2050.<sup>3</sup> The ability to reduce or even stabilize GHG will require nothing short of a massive and rapid transformation of the global economy.

*The ability to reduce or even stabilize greenhouse gases will require nothing short of a massive and rapid transformation of the global economy.*

## Greenhouse gases

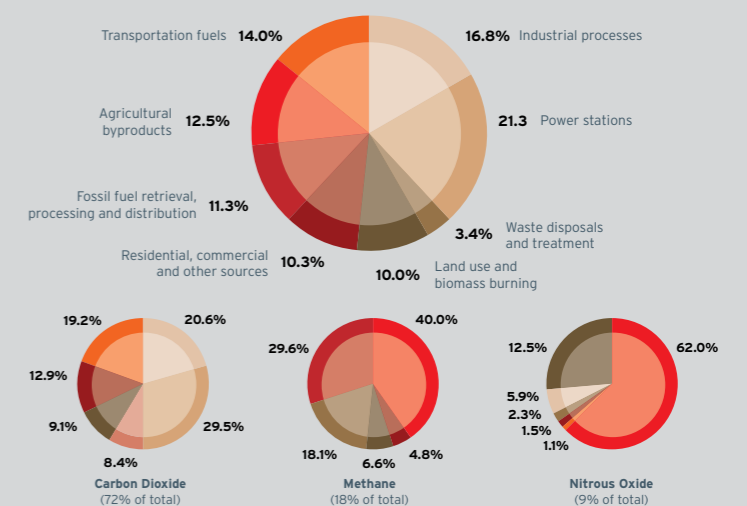
The most abundant greenhouse gases in the Earth's atmosphere are, in order of concentration, 1) water vapor 2) carbon dioxide 3) methane 4) nitrous oxide 5) ozone 6) CFCs. Aside from purely human-produced synthetic halocarbons, most greenhouse gases now have both natural and anthropogenic (human-induced) sources. Some of the main sources of greenhouse gases due to human activity include:

- ▶ Burning of fossil fuels and deforestation, causing higher carbon dioxide concentrations. Land use change (mainly deforestation in the tropics) account for up to one third of total anthropogenic CO<sub>2</sub> emissions.
- ▶ Livestock enteric fermentation and manure management, paddy rice farming, land use and wetland changes, pipeline losses, and covered vented landfill emissions, leading to higher methane atmospheric concentrations. Many of the newer style fully vented septic systems that enhance and target the fermentation process also are sources of atmospheric methane.
- ▶ Use of chlorofluorocarbons (CFCs) in refrigeration systems, and use of CFCs and halons in fire suppression systems and manufacturing processes.
- ▶ Agricultural activities, including the use of fertilizers, that lead to higher nitrous oxide concentrations.

Since about 1750 human activity has increased the concentration of carbon dioxide and other greenhouse gases. Measurement of Antarctic ice cores show that just before industrial emissions started, atmospheric CO<sub>2</sub> levels were about 280 parts per million (ppm) by volume. From the same ice cores it appears that CO<sub>2</sub> concentrations stayed between 260 and 280 ppm during the preceding 10,000 years. Since the beginning of the Industrial Revolution, the concentration of CO<sub>2</sub> has increased by about 100 ppm (from 280 ppm to 380 ppm). The first 50 ppm increase took place in about 200 years, from the start of the Industrial Revolution to around 1973; the next 50 ppm increase took place in about 33 years, from 1973 to 2006.

Source: Wikipedia

Annual Greenhouse Gas Emissions by Sector\*



\*These values are intended to provide a snapshot of global annual greenhouse gas emissions in the year 2000. The top panel shows the sum over all man-made greenhouse gases, weighted by their global warming potential over the next 100 years. This consists of 72% carbon dioxide, 18% methane, 9% nitrous oxide and 1% other gases. The lower panels show the comparable information for each of these three primary greenhouse gases, with the same coloring of sectors as used in the top chart. Segments with less than 1% fraction are not labeled. Source: [http://www.globalwarmingart.com/wiki/Image:Greenhouse\\_Gas\\_by\\_Sector.png](http://www.globalwarmingart.com/wiki/Image:Greenhouse_Gas_by_Sector.png)

## Footnotes

1,2) *Climate Change 2007: Synthesis Report. Summary for Policymakers.* Intergovernmental Panel on Climate Change, November 17, 2007. Available at <http://www.ipcc.ch/>. 3) *EU action against climate change. Leading global action to 2020 and beyond.* 2007. Available at [http://ec.europa.eu/environment/climat/pdf/eu\\_action\\_against\\_climate\\_change.pdf](http://ec.europa.eu/environment/climat/pdf/eu_action_against_climate_change.pdf).

## Historic challenge, historic opportunity

Against the many dire scenarios presented by a future of continued global warming, there are rays of hope that the time has come when the world is ready to take the aggressive actions necessary to counteract a continued rise in global temperature.

One such call for action was recently launched by the United Nations Energy Programme (UNEP) and leading economists with the announcement of its Green Economy Initiative.

At the announcement of the plan in London on 22 October 2008, UNEP Executive Director Achim Steiner said, "the worldwide financial crisis has created an historic opportunity to replace a system which has seen the world's GDP double between 1981-2005 but which has resulted in 60 percent of the Earth's ecosystem being degraded while 2.6 billion people are still living on less than \$2 per day. The flip side of the coin is the enormous economic, social and environmental benefits likely to arise from combating climate change and re-investing in natural infrastructure - benefits ranging from new green jobs in clean tech and clean energy businesses up to ones in sustainable agriculture and conservation-based enterprises."

The UNEP's Green Economy Initiative is based on three pillars: valuing and mainstreaming nature's services into national and international accounts; employment generation through green jobs and the laying out of policies; and instruments and market signals able to accelerate a transition to a green economy.

*"Without the addition of new recycling policies and investment incentives, it is unlikely that significant change will take place. The UNEP announcement and other statements by key governments and leaders do suggest however that real change can and will occur."*

The Initiative further identifies six priority sectors which would underpin the development of a new green economy:

- ▶ Clean energy and clean technologies including recycling
- ▶ Rural energy, including renewables and sustainable biomass
- ▶ Sustainable agriculture, including organic agriculture
- ▶ Ecosystem infrastructure
- ▶ Reduced emissions from deforestation and forest degradation (REDD)
- ▶ Sustainable cities including planning, transportation and green building

Commenting on the UNEP announcement, TOMRA vice president in charge of government affairs and market

development Wolfgang Ringel, said "we believe recycling must be an important component in the overall strategy of creating a new economy that can effectively deal with global warming, and we applaud the UNEP's acknowledgement of this in its Green Economy Initiative."

Continues Ringel: "In creating a green economy, the greatest level of investment will clearly have to be directed toward implementing technologies that will reduce global consumption of fossil fuels. The technology for various recycling solutions provided by TOMRA and others are helping to do just that, saving millions of tonnes of avoided greenhouse gas emissions each year. Yet we're only just scratching the surface in terms of what can be achieved. Without the addition of new recycling policies and investment incentives, it is unlikely that significant change will take place. The UNEP announcement and other statements by key governments and leaders do suggest however that real change can and will occur."

## Saving CO<sub>2</sub> emissions with automated recycling solutions

The best measure of a successful recycling system is the extent to which it can recover the highest percentage of used materials at the lowest cost, both financially and environmentally. To do so, the following elements must be present:

### Consumer participation

Encouraging a high level of consumer participation in the recycling process is best achieved by implementing some type of incentive system for bringing recyclables to a collection point. A monetary incentive in the form of a deposit has proven to be very effective, but other types of incentives such as discount coupons, lottery tickets, special promotions or point card systems can also be effective.

### Material sorting

Using an automated recognition and sorting system at the point of collection allows accurate separation of materials according to container type, color and material composition, maximizing the recycling value of the materials collected. To recover materials out of the general waste stream, the application of sensor-based recognition and sorting solutions at material recovery facilities offers the highest eco-efficiency.

### Material compaction

Compacting materials prior to transport provides the greatest opportunity for cost and CO<sub>2</sub> savings. But to ensure cost-effectiveness during the recycling process, compaction can only be undertaken when the material fractions are reliably sorted by material type and color.

TOMRA offers solutions that deliver all of these benefits, helping each year to efficiently recover tens of billions of waste items and significantly reduce CO<sub>2</sub> emissions.

*Helping the world recycle*



Reverse Vending Systems



Material Transport & Processing



Automated Recycling Centers



Material Recognition & Sorting



Baling & Compaction

### Support recycling

Producing new paper, glass, and metal products from recycled materials avoids 70% to 90% of the energy and pollution that results from products made from virgin materials. You can save 2,400 pounds of carbon dioxide per year by recycling half of household-generated waste. Recycle at home and promote recycling programs at your school or workplace.


# TiTech organizes unique waste sorting test

More than 100 waste management experts from across Europe and as far afield as Japan and the USA recently gathered in Germany to witness a unique waste test that could have major implications for the future treatment of residual municipal waste.

The test formed part of a two-day conference organized by TiTech, a TOMRA company specializing in sensor-based sorting systems, and consultants Ascon GmbH. It was set up to establish whether commercially valuable materials could be extracted from residual municipal waste after recycling was complete.

“Residual municipal waste is generally considered to be a negligible source of recyclable materials,” explained Jonathan Clarke, head of TiTech UK. “We wanted to see whether we could take the techniques normally used to sort dry recyclables and apply them to the residual waste stream. The objective was to determine whether more recyclable materials could be recovered after the rigorous combination of deposit and curbside recovery had been completed. We also wanted to establish if these materials were present at a high enough quality and quantity to be commercially viable.”

**The test**  
The test took place at the WeSoTech materials recycling facility (MRF) in Germany using municipal waste generated from Freising, a small town near Munich, where residents have separate collections for light packag-



**Residual Waste Test Results:**

Material	Percentage of total material recovered	Estimated amount of recoverable material from residual waste (metric tons)*	Estimated amount of material currently recovered from recycling bins per year (metric tons)
PE film	1.42	166,000	90,000
PO	1.80	212,000	28,125
Beverage cartons	0.50	60,000	90,000
PET	0.19	23,000	11,250
RDF	39.56	4,652,000	506,250
Metals	2.08	244,000	101,250
Paper	4.59	481,000	45,000
Wood	0.43	51,000	-
Residue	49.43	5,872,000	421,875

\*This is an estimate of the potential amount of recyclable materials that can be recovered from the residual waste in Germany. These estimates are based on the amount of waste generated by residents of Freising, Germany.

One of the TiTech material scanning units in action during the trial at the WeSoTech materials recycling facility in Germany.

ing, glass, paper and organics. The town already has a stronger than average recycling record.

Around 180 metric tons of residual municipal waste from the area was sorted using a combination of techniques found in a typical MRF - such as trommels, automated sorting technology and manual sorting - to demonstrate how much more recyclable material could be retrieved.

Preliminary results are promising and the above table shows which materials were recovered, and in what quantities.

Says Jonathan Clarke: “All the indications are that there is a lot more benefit to be derived from residual waste. If these results were repeated across Germany, for example, we calculate that almost 900,000 additional metric tons of materials like paper, plastics, glass and metals could potentially be recovered from the municipal waste stream. That’s about three times the amount cur-

rently being recovered through curbside sorting alone.”

The recovered materials from the trial have now been sent to laboratories and recycling companies to establish whether the quality and contamination levels are acceptable from a commercial reprocessing perspective. Feedback is positive so far, with one European plastic film reprocessor confirming that the quality of materials supplied from the TiTech trial is very good indeed. The full results are expected to be made available in the New Year.

Clarke concludes: “The preliminary results are particularly encouraging as the trial took place in Germany, where recycling participation is high. It is becoming clear that there is still the potential to extract more recyclable material from household waste and that the residual waste stream should be considered as a significant secondary source of recyclables, in conjunction with commingled collections. It will be very interesting to see the full results as they could have a significant effect on the way we view recycling and waste management in the future.”

# Commodas and UltraSort join forces



TOMRA, through its fully-owned subsidiary TiTech, acquired in July the assets of UltraSort, an Australia-based provider of material recognition and sorting solutions for the mining industry. UltraSort's solutions provide a strong strategic fit with those of Commodas, and the integration of the two operations positions them as the clear market leader in the segment.

The sensor-based sorting solutions offered by Commodas and UltraSort employ a variety of detection technologies. Using optics, near infrared, X-Ray fluorescence, radiometry, X-Ray transmission, and electromagnetic sensors, the machines can identify and sort any type of mineral, metal, gemstone or other mined resource - extremely fast and accurately. The systems are also highly robust and flexible, able to sort items as large as 300 mm and as small as 1 mm.

This advanced technology enables a wide range of efficiencies to be achieved by mining operations, such as the ability to:

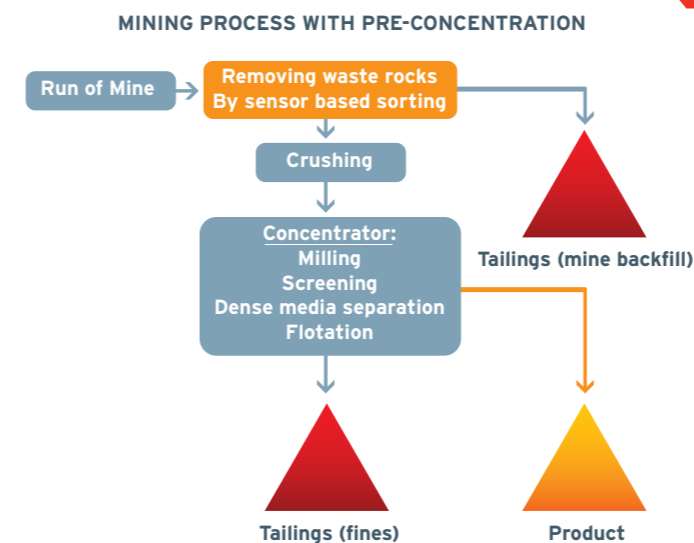
- Remove waste rock at the earliest stage in the processing of the mined materials, minimizing the requirements for crushing and milling downstream
- Pre-concentrate material underground, leaving waste rock in the mine to use as backfill
- Reduce transport costs
- Reduce or avoid surface tailings dumps (material leftover at the "tail end" of separation processes)
- Reduce the use of chemicals
- Save energy and reduce water usage
- Extend mine lifetimes

By reducing overall costs, increasing profitability, and minimizing the environmental impact of operational processes, the machines pay for themselves in a very short period of time. For example, in a nickel ore sorting operation equipped with the UltraSort UFS-EM machine, 30% of waste rock from the run-of-mine ore can be ejected at the start of the sorting process. At the same time, the nickel grade is upgraded from about 0.5% to more than three percent. This provides substantial benefits, meaning in some cases the difference between obtaining a saleable versus an unsaleable nickel ore product.

### Strategic fit

Commodas and UltraSort each bring to the table complementary

UltraSort UFS-EM installation at Consolidated Minerals Kambalda Operations, Australia.



strengths. With regard to their sensor technologies, UltraSort is strongest within the application areas of diamonds, uranium, and nickel, whereas Commodas is strongest in the areas of industrial minerals, gemstones and metal slag. On the market side, each company is strongest in different regions - Commodas in Europe and UltraSort in Africa, Australia and Canada.

### Integration

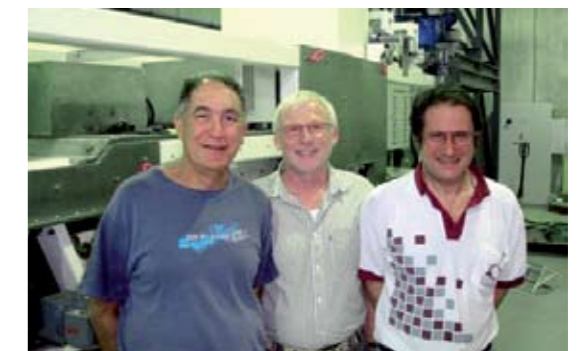
According to TiTech Product Manager Hartmut Harbeck, who is heading up the effort to integrate the operations of the two units, "in the near term we have four main areas we want to focus on: 1) integrating the product portfolio of Commodas and UltraSort; 2) bringing together the existing product development processes within the two companies; 3) increasing the sales network within UltraSort, and 4) creating a joint R&D program that takes advantage of our combined knowledge and expertise within the various recognition technologies. To better facilitate these efforts I have moved down to Australia so that I can work closely with the UltraSort team. Our collaboration thus far has been very good, and

### APPLICATION AREAS

- **Industrial Minerals**  
Limestone, Talc, Calcite, Rock Salt, Quartz, Feldspar, Silica
- **Base Metals**  
Copper, Nickel, Lead, Zinc, Tungsten
- **Precious Metals**  
Gold Ore, Platinum Ore
- **Fuel**  
Coal, Uranium, Oil Shale
- **Gemstones**  
Diamonds, Emeralds, Tanzanite, Rubies
- **Slag**  
High-Grade Steel, Copper, Ferrochrome

I think it is clear that our joining forces will help us deliver even more value to the mining industry going forward."

The founders of UltraSort Sydney Goodman (left) and Hilton Gordon (right), with CommoDaS/TiTech Product Manager Hartmut Harbeck (middle) at the UltraSort headquarters in Australia.



# New balers from Orwak



Orwak adds three new front-loading balers to their product portfolio

The new models 3105 and 3110 are perfect for customers looking for a compact solution to handle small volumes of packaging waste. The attractive new design appeals both to the eyes and the ears, with a new hydraulic system that reduces the sound level during operation to under 60 db - approximately the same level as a normal conversation.

Model 3105 and 3110 are the smallest frontal balers in Orwak's assortment and their low height and small footprint make them a good fit for applications that are tight on space. Both models are equipped with a range of convenient features, the primary difference between the two being that the 3105 generates lighter bales with a volume reduction ratio of 5:1 compared to 7:1 for the 3110.

At the other end of the spectrum, the new model 3610 is Orwak's largest and strongest front-loading baler. Replacing outgoing model 3600, the 3610 has a press force of 50 tons to produce high density commercial bales weighing up to 550 kg. This model also features the company's new silent hydraulic system.

Contact your local Orwak sales representative to get the full run down on the benefits of these great new balers.

Orwak compaction and baling solutions -



- for more profitable waste management

## TOMRA TRANSITIONS

### JO LUNDER

Board Chairman  
Tomra Systems ASA

A member of TOMRA's Board of Directors since April 17, 2007, Jo Lunder (47) took over the board leadership position in April of this year. In addition to TOMRA he also currently chairs the boards of Swix Sport AS and Elopak AS, as well as being a board member of Pronova BioPharma ASA, Aibel Group Ltd., and VimpelCom.

Over the course of his career Jo Lunder has held a number of senior positions within the telecommunications and IT industries, including Telenor, VimpelCom and Ementor. Currently he serves as Executive Vice President in charge of Industrial Investments at Ferd Group, a Norwegian investment firm.

"TOMRA's Board of Directors is composed of a very skilled and dedicated group of individuals, and I very much look forward to working with them and the management team to ensure the continued success of this strong organization. This is an exciting time for companies who can provide effective solutions to the world's pressing environmental challenges, and I am convinced that TOMRA in the coming years will play an increasingly larger role in providing these solutions. I am happy to have the opportunity to contribute to this effort," says Lunder.

TOMRA's Board of Directors currently consists of five external members and two internal representatives elected from and by employees of Tomra Systems ASA, Tomra Production AS, Tomra Butikkssystemer AS, and TiTech AS. For more information about TOMRA's board and governance structure, visit the corporate governance section under investor relations at [www.tomra.com](http://www.tomra.com).



### HÅKON VOLLDAL

Senior Vice President  
Business Development  
Tomra Systems ASA

Håkon was appointed to his current position on 1 November 2008, joining also at this time TOMRA's Group Management. Prior to this appointment he had held the position of Executive Vice President Business Development, North America, since September 2007.

Håkon has been a part of TOMRA's business development team since he joined the company in 2004 as Director Mergers & Acquisitions. He was also in charge of TOMRA's investor relations responsibilities for two years (2005-07).



### STEFAN EK

Managing Director  
Orwak AB

Stefan was appointed as Orwak's Managing Director in August 2008 after having served as Acting Managing Director since August 2007. Stefan joined the company in 2006 as Marketing and Sales Director.





- › INNOVATION
- › PASSION
- › RESPONSIBILITY

At TOMRA, we seek to make our company values of Innovation, Passion and Responsibility shine through everything we do. This photo shows a close-up of part of an artwork commissioned by TOMRA that expresses the color and spirit of its three company values, created by the Norwegian artist Maud Gjeruldsen Bugge in August 2008.

**TOMRA**  
Helping the world recycle