LEADING THE RESOURCE REVOLUTION

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Regional Director of the Americas
TOMRA Sorting
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We live in an age with the highest level of consumption our planet has ever seen.
Using more resources than ever before. More than our planet can continue to sustain.
AND PLASTIC LEAKAGE HAS STARTED TO DISRUPT OUR ECOSYSTEMS

Sources: Wrap, Ellen McArthur Foundation, World Bank
AND DON’T FORGET ABOUT LANDFILL
Only 2% of the planet’s annual plastic packaging production is reused for the same/similar products.
PUBLIC PRESSURE HAS CREATED A SERIES OF CASCADING EFFECTS

PUBLIC OPINION
Global focus on single use plastics as a global problem and deposit being one of the solutions...

MARKET PULL
...leads to a market pull from large brand owners and beverage companies

REGULATION
...in addition to a legislative push in EU, and some others states as well emerging countries

CHINA’s NATIONAL SWORD
Short-term demand for recycling solutions in waste exporting countries
WHAT IS TOMRA DOING ABOUT IT?
TOMRA is well-positioned to take advantage of this moment.

1. Solutions for optimal resource productivity
   - Circular Economy
   - Future of Food

2. Leading market position – fit for growth
   - Collection Solutions #1
   - Food Sorting #1
   - Recycling Sorting #1
   - Mining Sorting #1

3. Pioneer in application of sensor-based technology

4. Strong, people-minded performance culture

Revenues

- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018

MNOK

Great Place To Work European Business Awards
TURNING WASTE INTO VALUE...
TOMRA creates sensor-based solutions for optimal resource productivity.
TOMRA

SORTING SOLUTIONS

FOOD

RECYCLING

MINING

REVERSE VENDING

MATERIAL RECOVERY

TOMRA

COLLECTION SOLUTIONS

4200+

EMPLOYEES

GLOBALLY

~ 900 in America

+$1 billion

2018 REVENUE

2018 REVENUE

~ 900 in America
Deposit policies are undergoing a resurgence

INTERNATIONAL EMBRACE

CONTAINER DEPOSIT LAWS: A GROWING GLOBAL TREND

After decades of steady growth since 1970, use of container deposit laws across the globe is now expanding rapidly. With new programs coming on-line, in two years these laws will cover 600 million people worldwide – double the number of people covered in 2017.

© Container Recycling Institute, 2019
Deposit policies are undergoing a resurgence

21 countries have passed container deposit laws since 2005.

10 in 2018 alone!

<table>
<thead>
<tr>
<th>Region</th>
<th>Year Passed</th>
<th>2017 Population (millions)</th>
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<tbody>
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<td>Fiji</td>
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<tr>
<td>Northern Territory of Australia</td>
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<tr>
<td>Turks and Caicos</td>
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<td>19.5</td>
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<td>State of Maharashtra, India</td>
<td>2018</td>
<td>114</td>
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<tr>
<td>Turkey</td>
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<td>80</td>
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<td>Portugal</td>
<td>2018</td>
<td>10.31</td>
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<tr>
<td>Jamaica</td>
<td>2019</td>
<td>2.9</td>
</tr>
</tbody>
</table>
TOMRA has four decades of experience in deposit markets

ACTIVE IN EVERY GLOBAL DEPOSIT MARKET

40 BILLION cans and bottles collected annually

82,000 Reverse Vending Machines installed globally

$400+ MILLION Exchanged annually in deposits & fees in US alone

+ 26 more markets!
Today we have a fleet of RVMs for every situation
The key system-wide benefits of reverse vending solutions

1. Cost & carbon efficiency
2. System integrity
3. Consumer loyalty
Modern deposit systems are relying on bulk counting too
Facilitating the Reuse Economy
Business model innovation:
We are active in every link of the deposit value chain
FOOD
Potatoes, vegetables, nuts, fruit, dried fruit, seeds, grains, meat, gummies, seafood, tobacco

RECYCLING
Packaging, municipal solid waste, thermoplastics, paper, commercial & industrial waste, e-scrap, aluminum

MINING
Industrial minerals, gems, precious metals, ferrous metals, non-ferrous metals, fuels
>17,500 UNITS IN OVER 80 COUNTRIES

>10,600 FOOD UNITS

>6,800 RECYCLING UNITS

>165 MINING UNITS

• Not including machines sold on OEM agreement. Recount of TOMRA Sorting Solutions’ install base in 2017.
• Not including Compac units.
How does sensor-based separation work?

Feeding of unsorted material

High-tech sensors to identify objects

Precise ejection by ultra fast air jets

Product specific equipment design often including multiple technologies to maximize sorting efficiency

High-speed processing of information (material, shape, size, color, defect, damage and location of objects)
A common sensor-based technology portfolio

- VIS
- COLOR
- IR
- XRF
- LASER
- EM
- XRT
- LIBS
- NIR
- LED
- IRT
PARTNERSHIP
with leading R&D institutions (SINTEF, CTR, Fraunhofer ILT; Universities like RWTH and Brussels

20% of all employees work in in-house R&D

20% of all employees work in in-house R&D

80 patents owned

8% of revenue reinvested in R&D

OWN software and data processing tools

DEVELOPMENT of own sensors

KEY FACTS AND FIGURES R&D
MUNICIPAL SOLID WASTE

- Hard plastics, plastic film, mixed paper, RDF, metals, organics/biomass
  - NIR, VIS, XRT, LASER

PACKAGING

- Plastics, plastic film, cardboard, mixed paper, deinking paper, metals
  - NIR, VIS, EM

UPGRADING PLASTICS

- PET, PE, PP, flakes, etc...
  - NIR, VIS, EM

POST-SHREDDER

- NF metal, stainless steel, copper cables, copper, brass, aluminum
  - NIR, VIS, XRT, XRF, EM, COLOR

ELECTRONIC SCRAP

- Printed circuit boards, non-ferrous metal concentrates, cables, copper, brass, stainless steel
  - XRT, XRF, EM, NIR, COLOR

PAPER

- Deinking, cardboard, carton
  - NIR, VIS, EM
SINGLE-STREAM

SIMS – New York

- Paper, newspaper.
- Metals.
- Paperboard, Corrugated.
- Glass.
- Plastics. (PET/HDPE/etc...)
- Others...
MSW (MUNICIPAL SOLID WASTE)
>200 MSW & RDF PLANTS EXPERIENCE WORLWIDE

TOMRA (Optical Sorters)

Market Share in MSW plants Worldwide > 90%
MSW PROCESS

Reception Material MSW:

Feeding to Plant

Volumetric Separation Trommel

Ballistic Separator

FE & nFE Sorting
MSW PROCESS

Optical Sorting

- PP/PS
- HDPE Color
- Plastic MIX / Beverage Carton
- Organic Wood Glass
- PET
- LDPE Film
- Metals FE/NFE
- Paper & Cardboard
- RDF

Organic
Wood
Glass

Metals
FE/NFE

Paper &
Cardboard

RDF
RECYCLING “PET & PO” PLANTS
OUR EXPERIENCE ACROSS THE AMERICAS

RECYCLING

North America: >1150 systems
South America: >70 systems

Some Plants References in AMERICAS:

- SIMS NYC, USA
- FCC Dallas, USA
- FCC Houston, USA
- Canada Fibers, Canada
- Republic Rabanco, USA
- SIMS New Jersey MR, USA
- JP Mascaro, USA
- Republic Plano, USA
- Upstate Shredding, USA
- WestRock, USA
- SANCO (EDCO), USA
- American Iron & Metal, USA
- Gershow Recycling, USA
- EMTERRA, Canada
- CFL Toronto, Canada
- Multilixo, Brazil
- CTR Pernambuco, Brazil
- ESTRE Paulinia, Brazil
- ALEN, Mexico
- SulPET, Brazil
- CarbonLITE, USA
- Unifi, USA
- Mohawk, USA
- RIISA, Mexico
- ClearPath, USA
- Perpetual, USA
- Indorama-Ecomex, Mexico
- Evergreen, USA
- Global PET, Brazil
- M&G Fibras, Brazil
- Resipol (Wargo), Brazil
- Clodam, Brazil
- Coresa, Paraguay
- SMI (San Miguel Industrias), Peru
- Reciclar, Argentina
- Dak, Argentina
- Enka, Colombia
- Arquiplast, Brazil
- Etc....

Food and Mining

>2950 Systems
In all Americas
01/2019
AUTOSORT - UNIQUE TECHNOLOGY

- CONTINUOUS CALIBRATION
- NO LAMP ARMS AND NO COOLER
- TOMRA’S PATENTED FLYING BEAM® TECHNOLOGY
- DETECTS THE POLYMERS, COLORS & METALS.
- RESOLUTION UP TO 2 MM
- FOURLINE TECHNOLOGY
- 70% ENERGY SAVING AND DECREASES YOUR OPERATIONAL COSTS
By distinguishing the finest molecular characteristics in materials, TOMRA systems can see the difference between:

- PET bottle “blower” and PET trays “thermoformed”
- PETG and other difficult contaminants
- Identify different Papers grades.
- Paper types like cardboard or packing-paper can not be deinked and must be sorted out before.
THE AUTOSORT ADVANTAGE

**LOD Technology**

**Laser Object Detection**

- Featuring laser technology that sorts based on the feed material’s spectral and spatial characteristics.

- Laser Object Detection (LOD) technology detects material that near infrared technology is incapable of identifying such as black plastic, glass and waste items.

- With this new breakthrough, customers can easily upgrade their installed AUTOSORT’s and FINDER’s for multiple applications.
AUTOSORT FLAKE
GREATER PROFITABLILITY OF YOUR PRODUCT OUTPUT

Resolution up to 2 mm

Increased stability and less Downtime.

Continuous calibration

70% energy savings

Material, Color & Metal simultaneously detection.

Constant high-quality yield.

Flexible sensor configuration
GLOBAL PRESENCE

AN EXTENSIVE AGENT & DISTRIBUTOR NETWORK COVERING DIFFERENT SEGMENTS AND MORE THAN 80 COUNTRIES

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Phone: +1 916 388 3900
Recycling.us@tomra.com

OUR HEADQUARTERS

TOMRA Sorting subsidiary

TOMRA Asker, Norway
Food Leuven, Belgium
Recycling Koblenz, Germany
Mining Hamburg, Germany
We are unlocking value in the circular economy
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CLEAN LOOP RECYCLING

CLOSED LOOP RECYCLING

Data driven
legal oversight

Data on collection volumes and recycling

TOMRA COLLECTION SOLUTIONS

AUTOMATED COLLECTION

CURBSIDE COLLECTION

TOMRA SORTING SOLUTIONS

WASTE RECYCLING

Production

Distribution

Consumption

LOW QUALITY
Down-cycling

COMMODITY
Incineration
Landfill
We are unlocking value in the circular economy

Business case for plastics

Value increase: 2.5-7x
- $1,545 per ton Clear PP/PE
- $1,100 per ton Clear PET
- $550 per ton Mixed PET
- $220 per ton Mixed Plastic
LEADING THE RESOURCE REVOLUTION

https://www.tomra.com/en/sorting/recycling

Recycling.us@tomra.com

Thanks for your attention.