



Environment & Process

Capital Market Days 2008, Austria

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ANDRITZ ENVIRONMENT & PROCESS – OVERVIEW

Market and growth drivers

Strategy and outlook 2009



Business profile: technology and main markets

Global market leader for dewatering and drying systems for municipal sludge and special industrial applications.

| Technologies | Markets | Applications |
|-------------------------|--|--|
| Solid/liquid separation | <ul style="list-style-type: none">▪ Municipal▪ Industrial | <ul style="list-style-type: none">▪ Water, waste water, and sewage sludge▪ Chemicals, plastic, coal, minerals, salt, food and feed, biomass |
| Drying | <ul style="list-style-type: none">▪ Municipal▪ Industrial | <ul style="list-style-type: none">▪ Sewage sludge▪ Chemicals, plastic, salt, biomass, feed |
| Incineration | <ul style="list-style-type: none">▪ Municipal | <ul style="list-style-type: none">▪ Sewage sludge |



Business profile: structure of the business area

Division ES

| Technologies | Business focus | Markets 2007 |
|---|--|--|
| <ul style="list-style-type: none">▪ Filtration▪ Separation | <ul style="list-style-type: none">▪ Sales and manufacturing of components▪ Extensive service business | <ul style="list-style-type: none">▪ Municipal: ~40%▪ Industrial: ~60% |

Division ET

| Technologies | Business focus | Markets 2007 |
|---|---|--|
| <ul style="list-style-type: none">▪ Drying▪ Incineration | <ul style="list-style-type: none">▪ Design and erection of complete plants, manufacturing of critical components▪ Service business | <ul style="list-style-type: none">▪ Municipal: ~65%▪ Industrial: ~35% |



Municipal sludge treatment (I)

Past

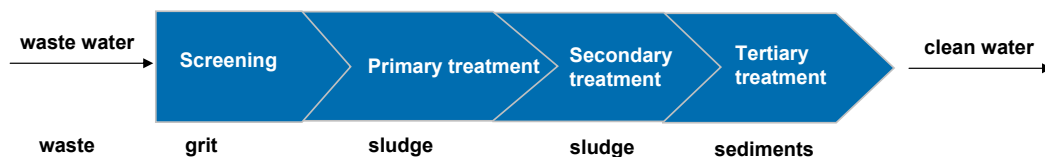
- Waste water from municipalities and from industry was led into rivers, ponds, sea.

Development stage

- Waste water treatment by removing
 - > solid particles by screening
 - > dissolved organic content by flocculation and sedimentation
- Dewatering of liquid sludge with belt presses/filter presses.

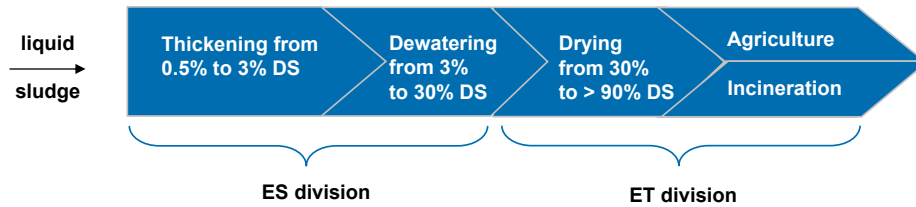
Today

- Waste water treatment in different stages using biological treatment and micro-filtration.
- Dewatering of liquid sludge with belt presses/filter presses or centrifuges followed by thermal drying or incineration.



Municipal sludge treatment (II)

- From liquid sludge to a valuable product

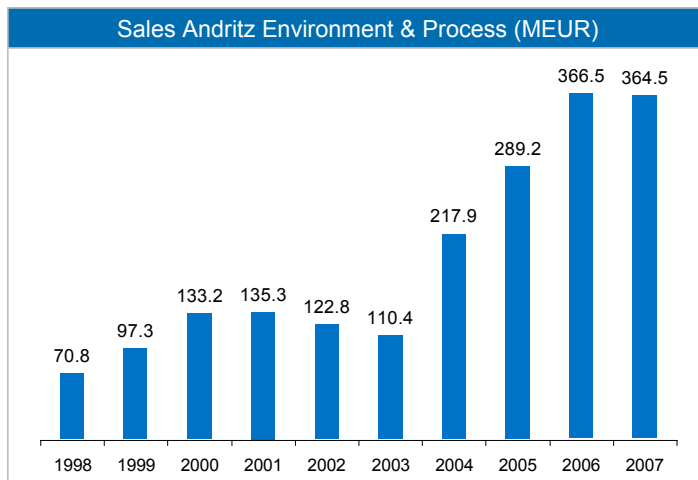


- Andritz is the only company covering all technologies of the process chain.
- Andritz is a global market leader in dewatering and drying of municipal sewage sludge.



Strong growth through organic expansion and acquisitions

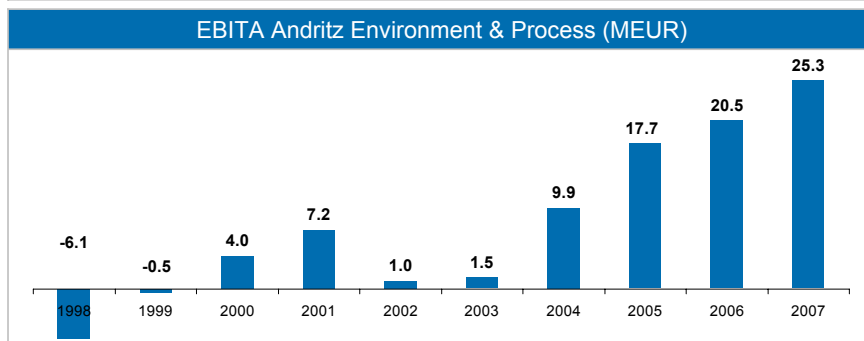
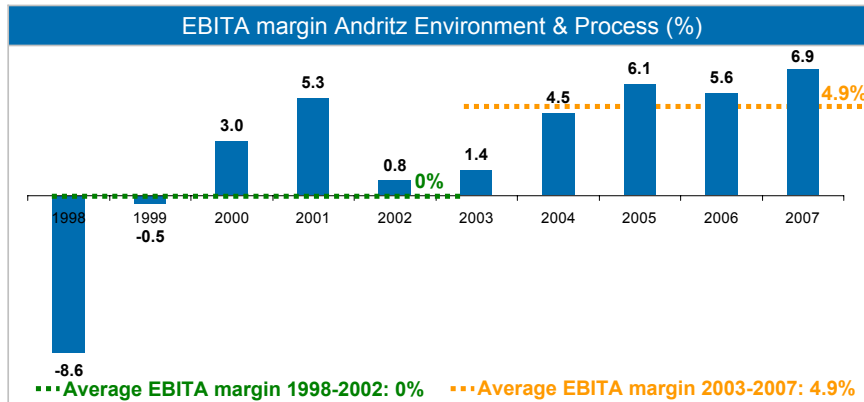
Sales 1998-2007: ~18% CAGR



| Acquisitions | |
|--------------|------------------------------------|
| 1992 | TCW Engineering |
| 1996 | Guinard |
| 2002 | 3SYS |
| 2004 | Bird Machine |
| 2004 | NETZSCH Filtration |
| 2004 | Fluid Bed Systems of VA TECH WABAG |
| 2005 | Lenser Filtration |
| 2006 | CONTEC Decanter |



Long-term development of profitability

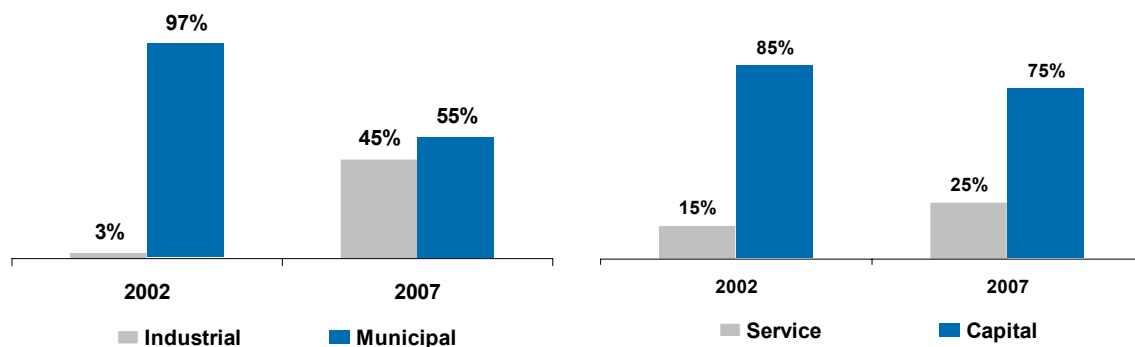


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End markets and order mix

- Through acquisitions better balance between municipal and industrial customers.
- Service business with higher profitability developed favorably.



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Municipal sludge treatment: products

Thickening and dewatering

- Screening
- Drum thickeners
- Belt thickeners
- Belt presses
- Centrifuges
- Filter presses



High-performance decanter centrifuges



Filter presses



PowerPress/SMX belt filter presses

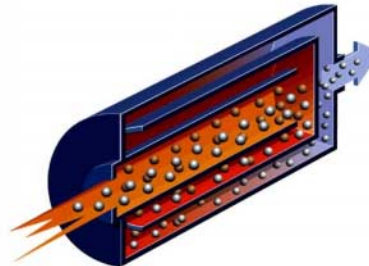
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Municipal Sludge Treatment – products

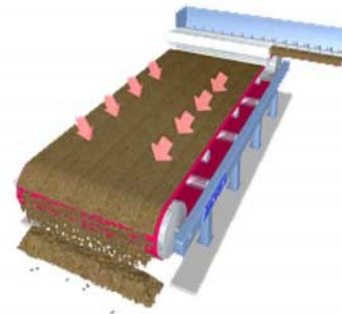
- Thermal treatment (drying) technologies



Fluidized Bed Dryer



Drum Dryer



Belt Dryer

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Important references (I)

Municipal sludge treatment: BDS plant in Nufri, Spain



Product: sludge from fruit-juice plant
Water evaporation: 3,200-5,300 kg/h
Heat generation: waste heat, hot water
Start-up: 2005

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Important references (II)

Municipal sludge treatment: fluidized bed drying plant Susteren, Netherlands



Water evaporation capacity: 8,300 kg/hr
Sludge throughput: 11,000 kg/hr
Operation: 24h/day, five days per week
Final product: dry granules >92% DS
Commissioning: 2002

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Important references (III)

Municipal sludge treatment: dewatering and drum drying plant Daldowie, UK



Plant type: 12 centrifuges D7LL, six drum drying lines DDS 40
Input: industrial and municipal sludge
Dewatering: from 2 to 28% TS
Drying: from 28 to 92% TS
Final product: 1-6 mm granulate
Evaporation rate: 22,000 l H₂O/h
Start up: 2002

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Industrial processes: products and applications

| Products | Applications |
|-------------------|--|
| Centrifuge | ▪ Petrochemicals (PVC, HDPE, PTA, Melamine, etc.) |
| Hyperbaric filter | ▪ Minerals (calcium carbonate, potash, etc.) |
| Vacuum filter | ▪ Ores (bauxite, copper concentrate, iron ore, etc.) |
| Filter press | ▪ Coal (fines) |
| Belt press | ▪ Pigments (TiO ₂) |
| | ▪ Food (palm oil, juice, dairy, beer, starch, etc.) |
| | ▪ Industrial sludges (metallurgy, oil sludge, harbour/river mud, etc.) |

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Industrial processes: market position

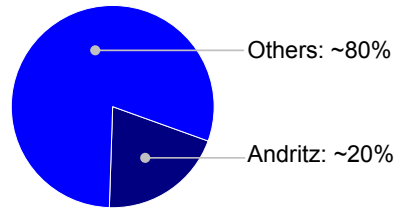
Andritz is one of the leading suppliers of dewatering equipment for the

- Mining industry
- Petrochemical industry

Andritz is the leading supplier of

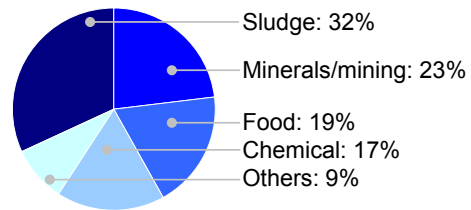
- filter presses and
- filter plates

World market shares for filter presses
(market volume: ~370 MEUR)



Source: Andritz estimate

Andritz filter press business by product segment



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Industrial processes: products (I)

Hyperbaric pressure filters:

in disc and drum design for fine coal and ore



High-performance belt presses:
for tailings and dredgings

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Industrial processes: products (II)

Decanter centrifuges



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Industrial processes: products (III)

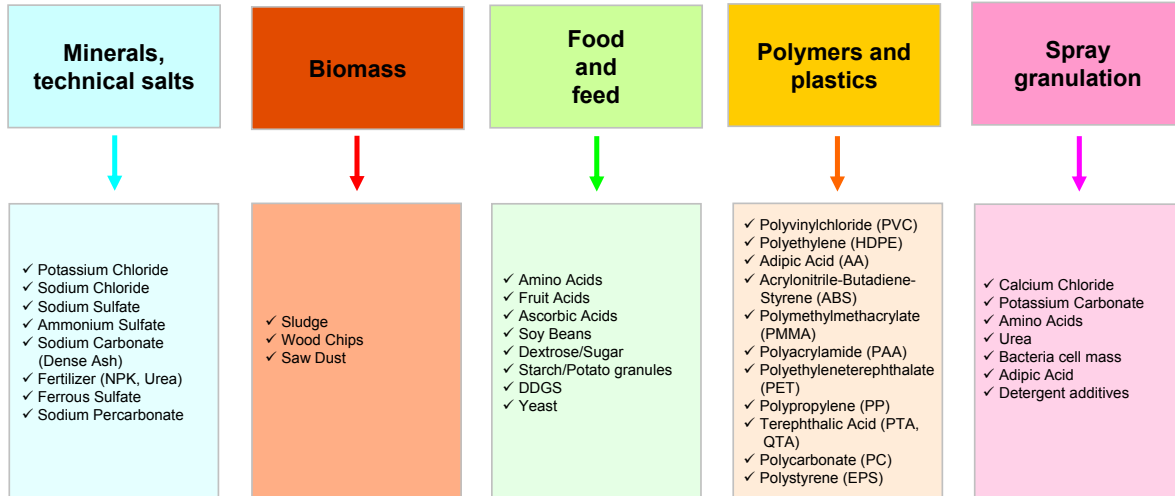
Filter press and membrane



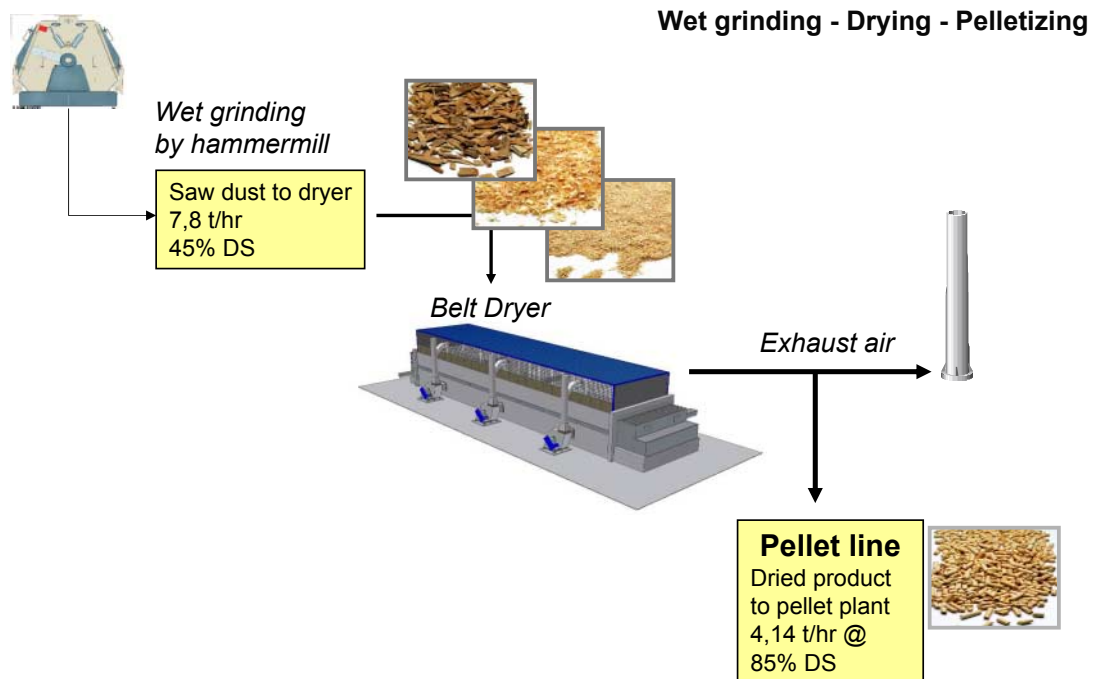
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Industrial processes: drying

- With its different drying technologies (drum, belt, fluidized bed), Andritz covers a broad range of applications.
- With the current market share of less than 2%, a growth opportunity is given.
- Market size: ~1,200 MEUR



Biomass drying: complete process capability



Fluidized Bed Drying System (FDS)



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Fluid bed drying plant in Wesseling, Germany



| | |
|-----------------|--------------------------|
| Plant type: | HDC 2500/3000 |
| Capacity: | 44,000 kg/hr dry product |
| Heating source: | Saturated steam |
| Product: | Polyethylen (HDPE) |
| Start-up: | 2004 |

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MARKET AND GROWTH DRIVERS

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Municipal sludge treatment: drivers (I)

Why sludge treatment?

To reduce volume and cost for transportation and disposal.

- 1,000 kg of liquid sludge (3% dry solids) results in 100 kg dewatered sludge (30% dry solids) and finally in 33 kg dried sludge (>90% dry solids).
- a municipality of 500,000 inhabitants needs more than 30 large silo trucks per day to transport liquid sludge (3% dry solids), but only one truck to transport the resulting dried sludge (> 90% DS) (per day).

To increase heating value.

- Mono incineration of dewatered sludge (30% dry solids) requires additional fuel for combustion and requires huge exhaust cleaning systems.
- Dried sludge (>90% dry solids) has the same energy content as lignite (~12 MJ/kg DS).

To produce pathogen free sludge for agricultural applications and for safe handling.

To reduce odour emissions during storage.

Municipal sludge treatment: drivers (II)

Sludge drying and incineration

Legislation to support demand for sludge treatment equipment, especially drying

- Council directive 86/278/EEC on the protection of environment in particular soil was issued. Thermal treatment of sludge is an accepted technology for reduction of pathogens in sewage sludge used as fertilizer.
- Council directive 1999/31/EC has banned disposal of biodegradable waste (> 3%) on landfills since 2005 to reduce uncontrollable release of methane.
- US municipalities require class A sludge (pathogen free) for agricultural use which favors sludge drying.

Increasing awareness for avoiding environmental pollution

- More and better waste water treatment leads to increased amount of sewage sludge.

Industry

- Incineration of sludge in coal fired power plants, cement kilns, and waste incineration furnaces.



Municipal sludge treatment: drivers (III)

Dried sewage sludge – a flexibly applicable material for:

Recycling



Agriculture

- pathogen free
- recycling of minerals to the recycling process
- sludge is a long-term fertilizer



Landscaping

- improvement of the soil



Thermal Utilization



Incineration in cement kilns

substitution of fuel and minerals
= **residual free process**



Incineration in a coal fired power station

substitution of brown and hard coal
= **alternative fuel**
(Ø 11-13 MJ/kg DS)



Granulate combustion EcoDry

substitution of natural gas
= **autothermal heating of the dryer**



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Market and growth drivers

STRATEGY AND OUTLOOK 2009



Strategy

- Develop and offer technologies to become the leading specialist for dewatering and drying systems.
- Manufacture critical components in own shops and source non-critical items locally.
- Further expand global service activities.
- Grow in mining equipment market by
 - > covering all relevant regions
 - > broadening product range
- Expand in fast growing biomass markets
 - > ethanol
 - > wood (chips, sawdust, etc.)
- Increase activities in sludge incineration.

Outlook

- Five-year growth target:
 - > Sales of 400 MEUR with EBITDA of 8-10% (Capital Market Days in Edinburgh, 2005)
- Further growth of service business due to increased installed equipment base.
- Mining business will further grow
 - > coal is one of the main energy sources
 - > tar sand is a costly but important resource for hydrocarbons
 - > shortage in ores (iron, copper, bauxite, etc.) requires capacity increase in mining industry; Andritz will intensify sales activities in Africa, South America and Australia.
- Biomass is one of the important energy resources
 - > sludge treatment and incineration
 - > waste wood (chips, pellets) for industrial and private combustion
 - > bio-ethanol

Further growth is expected to be driven by growing stringent environmental legislation.
- Potential for growth in food- and agriculture-markets.
 - > strong in oils & fats
 - > improve in other areas



OUR VISION:
**World market leader for high-tech production systems
and services for pulp, paper, hydropower, steel,
and other specialized industries.**
