

Outotec

Utilizing waste to produce energy
for district heating

John Hebenton

Beijing May 2017

奥图泰简介/ Outotec in brief

- 奥图泰提供领先的技术和服务，确保可持续性地利用地球上的自然资源。

Outotec provides leading technologies and services for the sustainable use of Earth's natural resources

- 作为选矿和冶炼技术领域内的全球领导者，奥图泰在过去的几十年中已经为矿冶行业的客户开发了许多突破性的技术。

As the global leader in minerals and metals processing technology, we have developed many breakthrough technologies over the decades for our customers in mining and metals industries

- 同时，奥图泰还为工业废水处理、替代能源的利用和化工行业提供创新的解决方案。

We also provide innovative solutions for industrial water treatment, the utilization of alternative energy sources and the chemical industry

- 奥图泰集团在赫尔辛基OMX纳斯达克证券交易所上市。

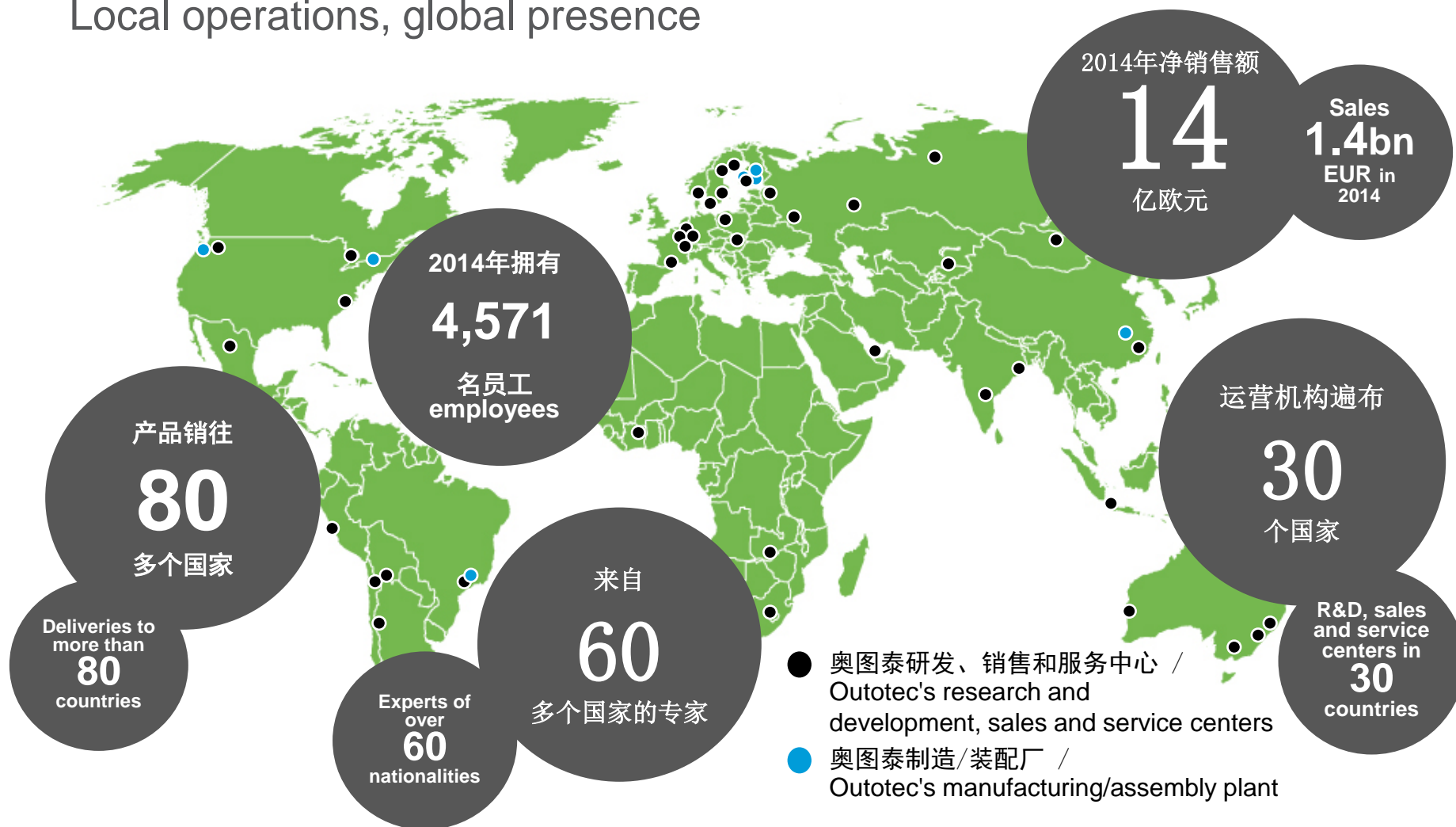
Outotec shares are listed on NASDAQ OMX Helsinki

名列全球
最具可持续性
发展企业
第12名

The 12th
most
sustainable
company of
the world
(2015)

本地化运营，全球性覆盖

Local operations, global presence



拥有广泛的供应商网络，并与供应商建立了良好的长期合作关系
Wide supplier network with established long-term relationships

Outotec in China - since the 1960's – 280 Sites

Outotec presence in China

奥图泰在中国

Outotec is a leading global provider of process solutions, technologies and services for the mining and metallurgical industries. The company utilizes its extensive experience and advanced process capabilities to provide plants, equipment and services based mainly on proprietary technologies. Outotec works in close partnership with its customers and provides proven, environmentally sound and energy saving solutions.

Based on mining and metallurgical technologies designed by Outokumpu and Lurgi, Outotec has a strong market position. Outotec Oyj is listed on the NASDAQ OMX Helsinki as an independent company and the name change occurred in April 2007.

Outotec has been present on the Chinese market since the 1960s when it began providing technology to the metals industry. It supplied the first flash smelting to Jiangxi Copper Corporation. Over the past several decades, Outotec has provided several plants and many equipments to its clients in China. It is considered a strong partner in the mining and metallurgical industries within China.

With the recent rapid growth of the China market, the company decided to expand its team in China. The Outotec Beijing Representative office was established in 1994 and followed by Outotec Shanghai Co., Ltd. in 2004. In 2010, Outotec acquired Larox. The company continues strengthening its position by bringing the most advanced solutions to the booming Chinese market.

在矿业和冶金行业、奥图泰的工艺解决方案、技术和服务在全球处于领先地位，并为客户提供创新、环保、节能的解决方案。我们凭借丰富的经验和先进的工艺技术为客户提供基于专属技术的完整工厂、设备和服务。

基于奥托昆普和鲁奇的矿业和冶金技术，奥图泰建立了稳固的市场地位。奥图泰作为独立公司在赫尔辛基纳斯达克OMX上市，并于2007年4月正式更名为奥图泰。

从19世纪60年代起，奥图泰开始在中国市场展露头角，为中国金属行业提供技术。我们为江西铜业公司提供了中国第一个铜闪速熔炼工厂。随后的几十年中，我们为中国客户建立了十几家工厂，并提供了许多设备。在中国，我们是矿业和冶炼行业客户的重要合作伙伴。

随着中国市场的快速发展，奥图泰在中国的团队也进一步壮大。1994年成立奥图泰北京办事处，2004年在上海成立公司。2010年，奥图泰收购了以过滤技术著称的芬兰拉罗克斯公司，至此公司在中国拥有员工上百人。奥图泰为中国市场带来了先进的解决方案，同时也巩固了在中国市场的地位。

Succeeding together with our clients

与客户共成长

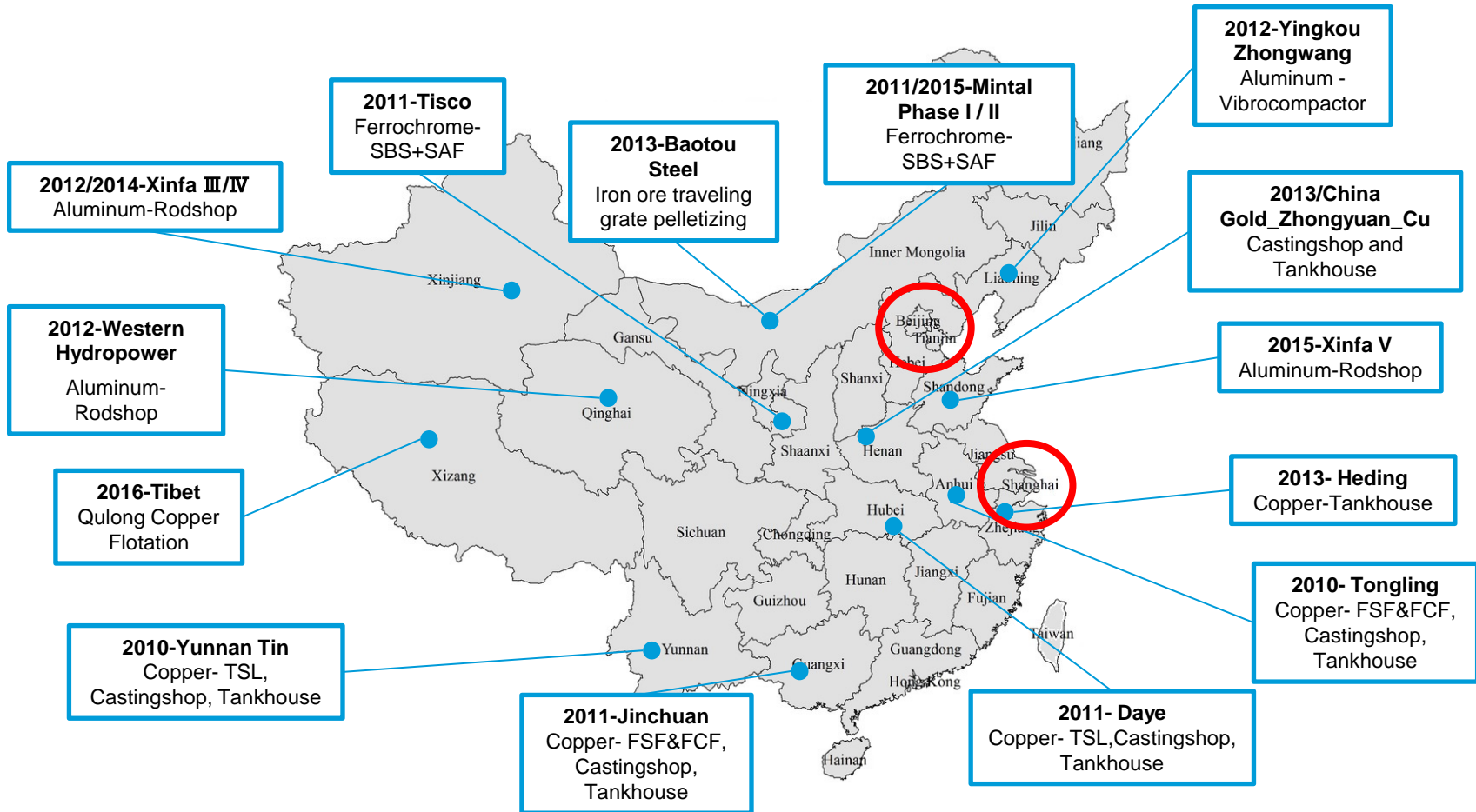


Outotec Shanghai
奥图泰上海

Outotec Beijing
奥图泰北京

Outotec Suzhou
奥图泰苏州

Significant Projects in 2010 – 2016



奥图泰致力于可持续性

We are committed to sustainability

- 可持续性融入我们所做的一切

Sustainability is integrated into everything we do.

- 90%的订单量都属于环保产品和服务(OECD定义)

90% of order intake was classified as environmental goods and services (OECD definition).

- 在2015年，由《企业爵士》杂志（Corporate Knights）发起的“全球可持续发展最佳企业百强”评选活动中，奥图泰名列第十二名（2014年位列第三）

Outotec was ranked 12th most sustainable company on Corporate Knights' Global 100 index in 2015 (3rd in 2014).

- 奥图泰承诺遵守《联合国全球契约》有关人权、环保、劳工和反腐败的原则

We are committed to the principles of The United Nations Global Compact regarding human rights, environment, labor and anti-corruption.

- 自2010年以来，奥图泰一直基于GRI指南编制报告

Our reporting is based on GRI G4 guidelines and third-party assured.



MEMBER OF
**Dow Jones
Sustainability Indices**
In Collaboration with RobecoSAM



选矿 / Minerals Processing

- 提供可持续的解决方案，从预可行性研究到完善的工厂和生命周期服务，全面涵盖。
Sustainable solutions from pre-feasibility studies to complete plants and life-cycle services
- 我们提供全面的产品，对于几乎所有类型的矿石均可实现高效且盈利的处理。
Our comprehensive offering makes the efficient and profitable treatment of virtually all ore types possible
- 凭借超过一个世纪的丰富经验、悠久的传统以及广泛的研发资源，奥图泰不断开发可持续技术。

With more than a century of experience, we have the established R&D resources to continuously develop sustainable technologies

解决方案 / Solutions for

选矿厂	Concentrators
破碎	Comminution
浮选	Flotation
脱水	Dewatering
服务	Services
操作和维护	Operation & Maintenance



金属、能源和水 / Metals, Energy & Water

- 奥图泰开发了广泛的金属冶炼解决方案，可用于加工几乎所有类型的矿石、精矿和精炼金属，包括硫酸生产。
Extensive range of solutions for processing virtually all types of ores and concentrates to refined metals, incl. sulfuric acid production
- 奥图泰提供创新的生物质能、煤炭、污泥、农业和工业副产品以及分类废物解决方案。
Innovative solutions for biomass, coal, sludge, agricultural and industrial by-products as well as sorted waste
- 奥图泰还提供从油页岩中获取石油以及从污水、污泥和灰渣中可持续回收磷的解决方案。
Solutions for oil winning from oil shale and phosphorus recycling from sewage sludge ashes
- 采用奥图泰解决方案所生产的水完全符合环保排放标准，最大限度地提高了水的循环利用，并减少了水和能源的消耗。
Our solutions produce water that meets environmental discharge standards, maximize water recycling and reduce water and energy consumption

解决方案 / Solutions for

有色金属	Non-ferrous metals
黑色金属和铁合金	Ferrous metals and ferroalloys
轻金属	Light metals
可再生能源与传统能源	Renewable & conventional energy
工业水处理	Industrial water treatment
服务操作和维护	Services incl. operation & maintenance



众多样板设备正在运行中

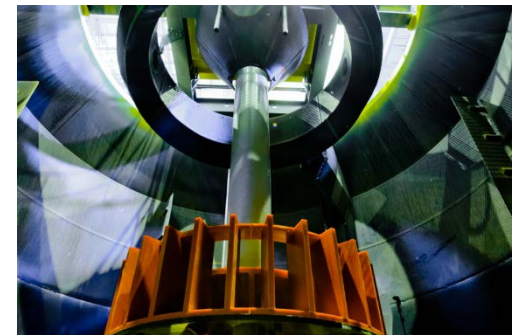
Numerous reference plants in operation

- 130个有色金属熔炼炉 / non-ferrous smelters
- 650套硫酸设备 / sulfuric acid plants
- 1,100台磨机 / grinding mills
- 10,000套浮选设备 / flotation units
- 1,800台浓密机 / thickeners
- 3,500台过滤机 / filters
- 20套铬铁矿（铁合金）造球和烧结设备及9套铁合金熔炼炉 /
pelletizing and sintering plants for chromites (ferroalloys),
and 9 ferroalloy smelters
- 340套铁矿石烧结设备 / iron ore sintering plants
- 67套铁矿石造球设备 / iron ore pelletizing plants
- 290套流化床焙烧设备 / fluidized bed roasting plants
- 50套氧化铝焙烧设备 / alumina calcination plants
- 110套生物质能流化床能源系统 / fluidized bed energy systems for biomass, waste to energy and sludge

闪速熔炼和闪速吹炼设备
广西金川有色金属公司
中国



TankCell® 浮选设备
First Quantum Minerals公司
芬兰凯维斯塔
Kevitsa



锰烧结设备
Kalagadi Manganese公司
南非

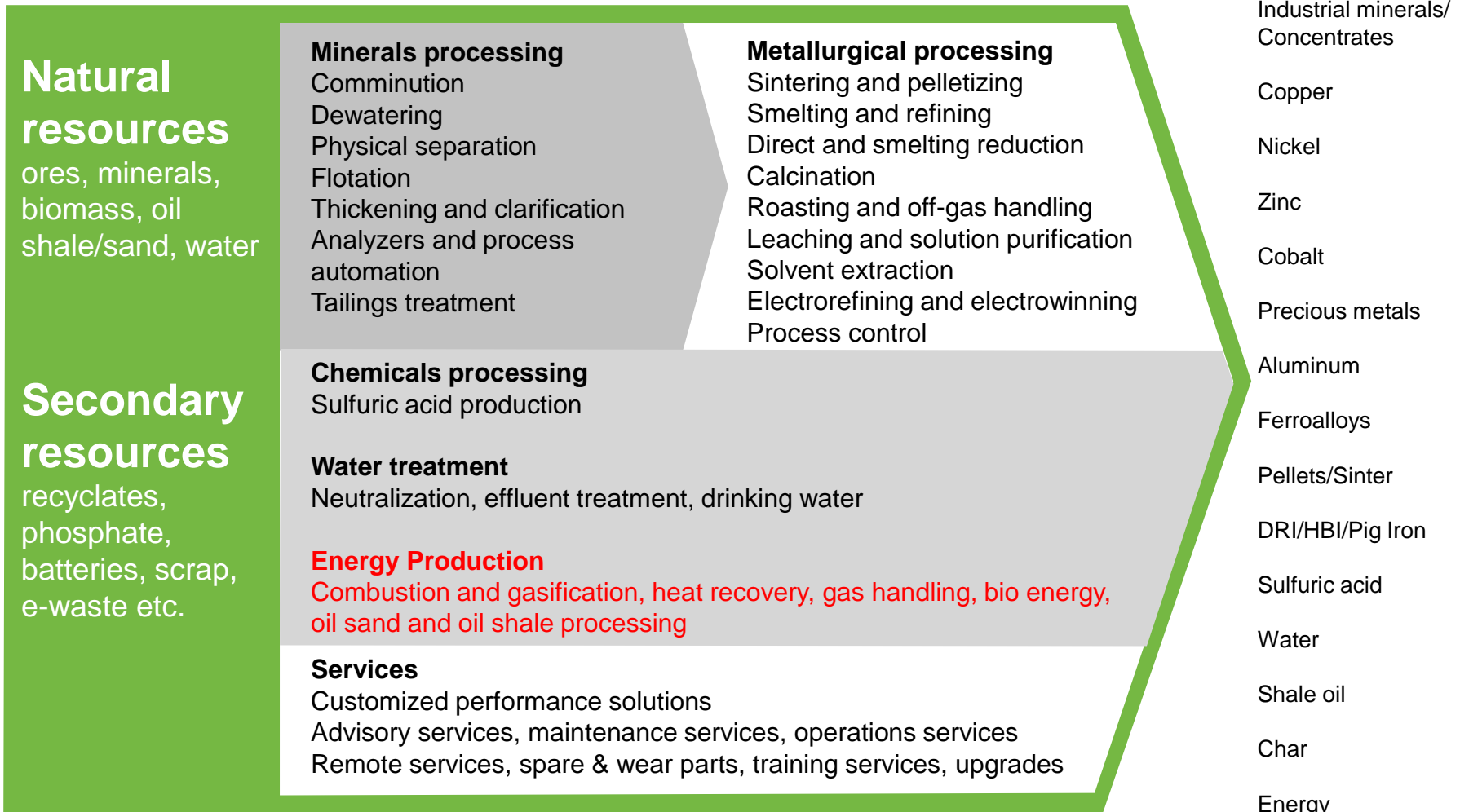


Award-winning clean technologies

- Flash Smelting - Flash Converting technology for sulfidic copper ores
 - ASM Historical Landmark award in 2001;
 - The cleanest copper smelting technology in the world
- Ferrochrome process
 - Winner of the 2007 Cleantech Finland® competition
 - Qualified for the European Business Awards for the Environment 2008 competition;
 - Because of its cleanness and energy-efficiency.
- A new copper production method
 - Quality Innovation of the Year 2007 by Excellence Finland
 - Because of low investment, low operating cost and environmental sustainability.



Portfolio of world-class technologies and services



Long-term customer relationships with the industry's top companies

Selected reference customers of Outotec

Major global mining companies



Intermediate sized companies



Local mining and metallurgical companies in emerging regions





Outotec

Cheap and Wet Fuel Utilization
Technologies and Solutions

60 years of Outotec Fluidized Bed technology



Alumina calcining
Iron ore reduction



Gold roasting
Zinc roasting



CFB Combustion
Sludge Incineration



BFB Combustion /
Advanced Staged
Gasification

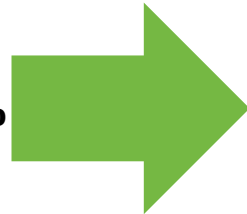


MSW treatment options

“Getting rid of the waste”



100%



100%



Landfilling / wild dumping

Residue of MSW

100% as waste



Old Grate Firing

25% Bottom Ash

2% Filter Ash

“Making most of the waste”

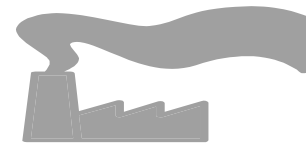


(Municipal Solid Waste)

100%



65%



Old Grate Firing

13% Bottom Ash

1,5% Filter Ash

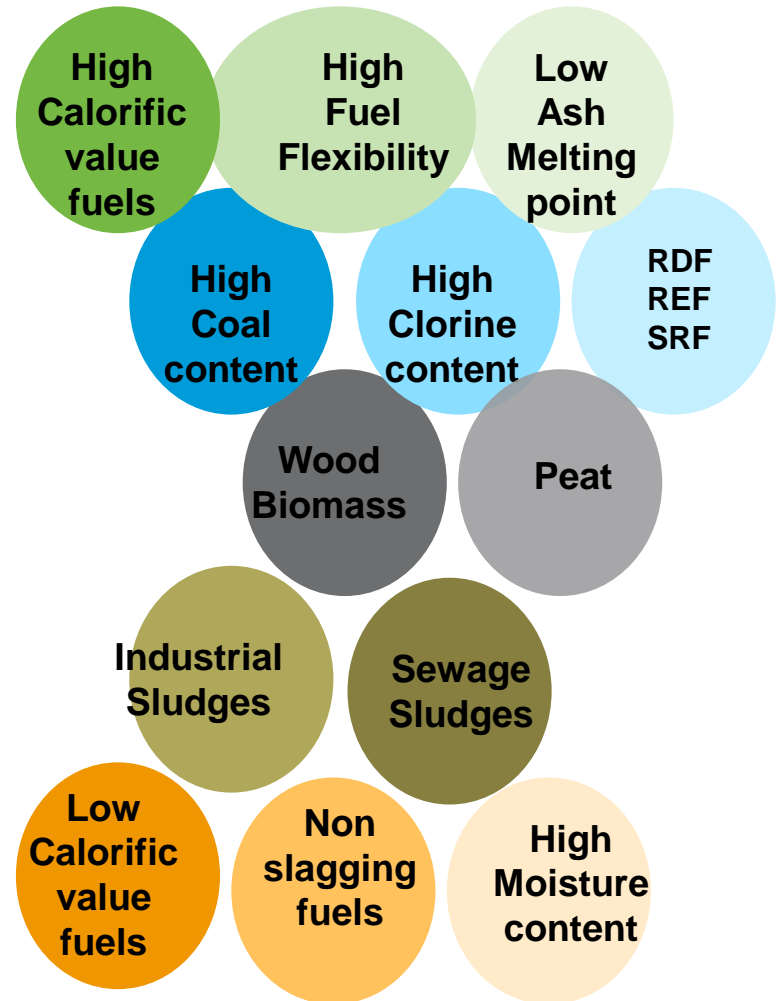
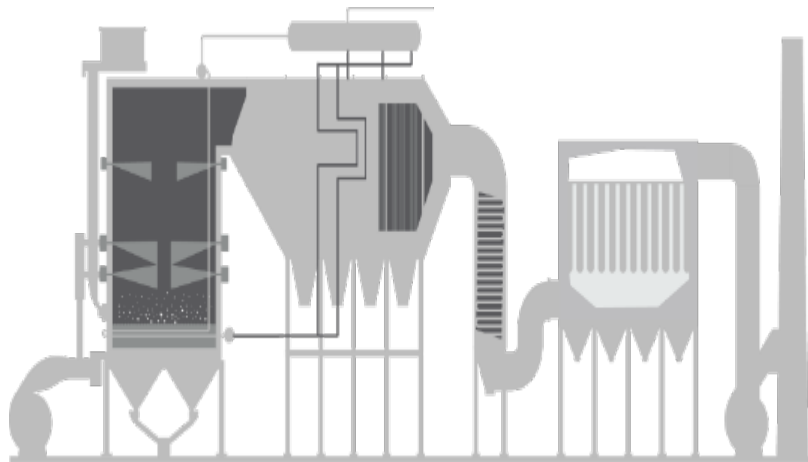
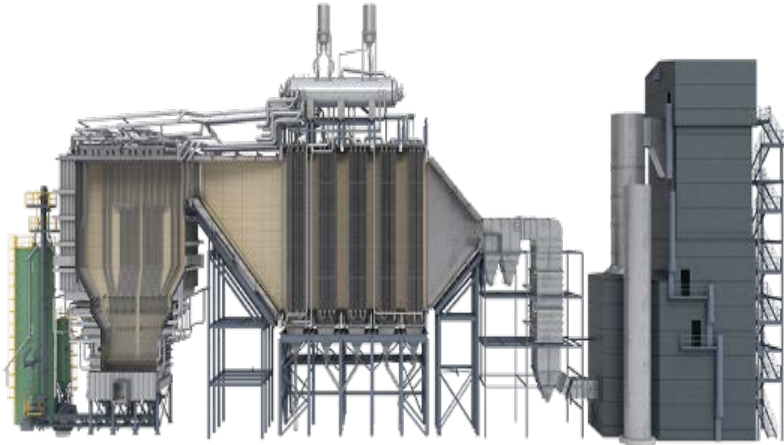


Modern Fluidized Bed Technology by Outotec

5,5% Boiler Ash

1,5% Filter Ash

Solid and liquid fuels are easy to use in Outotec's Fluidized Bed Technology



Recent examples of our more than 100 Energy Projects (+ nearly 300 other fluidized bed solutions)



Sper S.p.A, Sicily, Italy:

Fuel: Eucalyptus tree biomass

Electricity 15 MWe



Enefit, Estonia

Production outputs

Oil 290 000/a

Electricity 28 MW

Plainfield Renewable energy

Fuel Construction and Demolition Waste

Electricity 45 MWe



Hereford, Texas USA

Fuel : Cattle manure

Capacity : 420.000 t /a



Zürich, Switzerland

Fuel: Sewage sludge

Capacity: 100 000 t/a



Modern Karton, Turkey

Fuel: Biological- and paper sludge, rejects

Capacity 450 000 t/a

Electricity: 30 MWe

Environmental technologies

- E- Waste smelting and metals recovery
- Waste to Energy
- Sludge Incineration
- Arsenic, spent acid and mercury removal from waste streams
- Tailings treatment, paste plants
- Clean smelting technologies
- Upgrading of existing smelting plants with clean technologies
- Cleantech iron ore pelletising



Contacts

China

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Outotec



Sustainable use of
Earth's natural resources