Company Presentation

Iranian-German Waste Management Workshop

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Tehran, 25 February 2017

Steinmüller Babcock Environment

SBENG

NIPPON STEEL & SUMIKIN ENGINEERING GROUP

Company Information

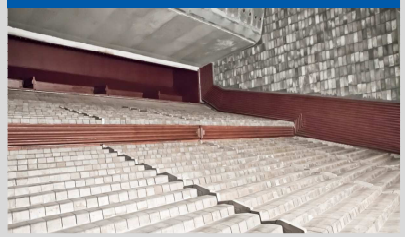
- International company for plant construction in the field of environmental and energy technology
- More than 150 years of tradition and know-how
- Worldwide more than 1,600 reference plants
- Technology supplier and EPC-Contractor for turnkey plants
- Member of the Nippon Steel & Sumitomo Metal Corporation

Energy from Waste

Flue Gas Cleaning

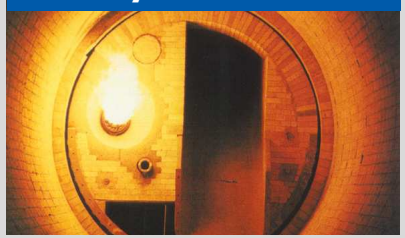
After Sales Service

Grate Incineration



Gasification (DMS)

Rotary kiln Inciner.



Ownership Structure

NIPPON STEEL & SUMITOMO METAL

Turnover: 38.3 billion €
Employees: 84,837

100 %

Leading with Determination
NIPPON STEEL & SUMIKIN ENGINEERING

Turnover: 2.5 billion €
Employees: 4,954

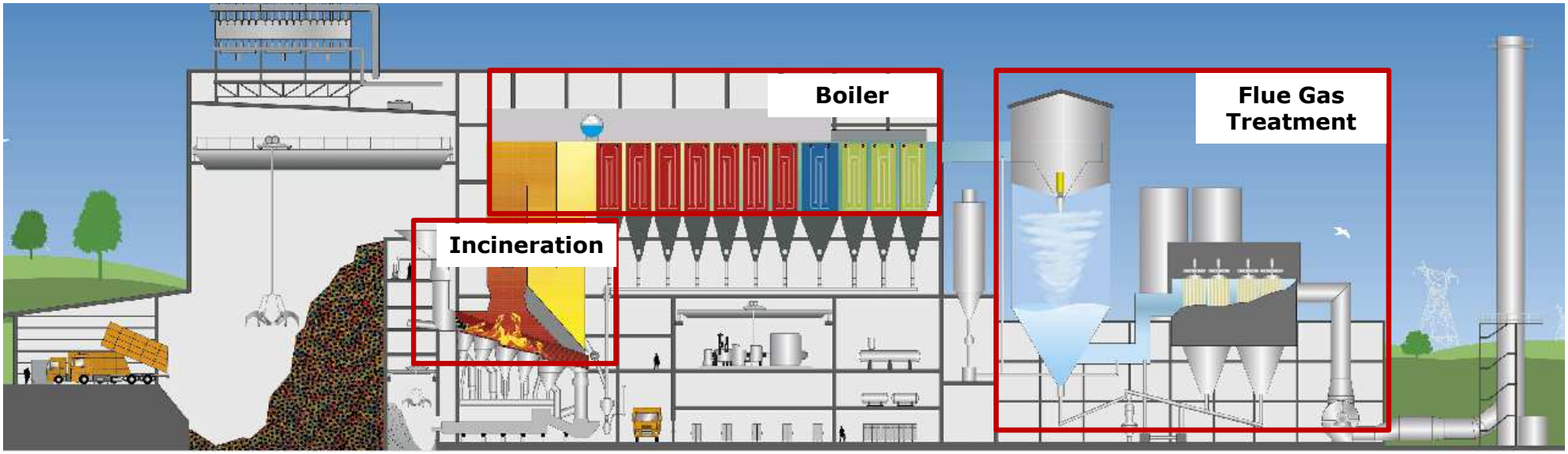
100 %

Steinmüller Babcock Environment
NIPPON STEEL & SUMIKIN ENGINEERING GROUP

Turnover: 201.2 million €
Employees: 265

* all information for the financial year 2015

SBENG Offer & Partner Modell



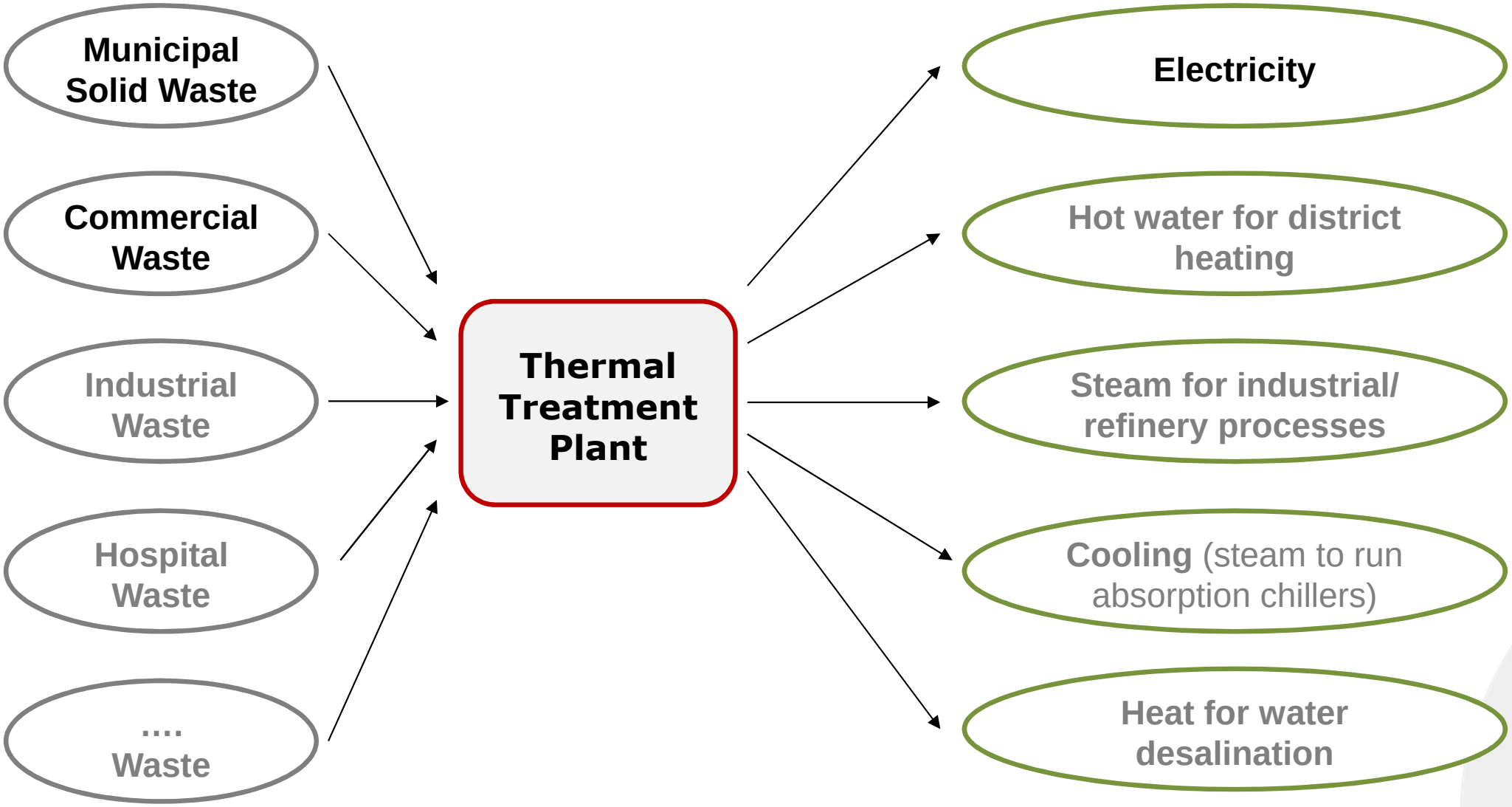
SBENG own technology

- Incineration Technology
- Boiler Technology
- Flue Gas Treatment

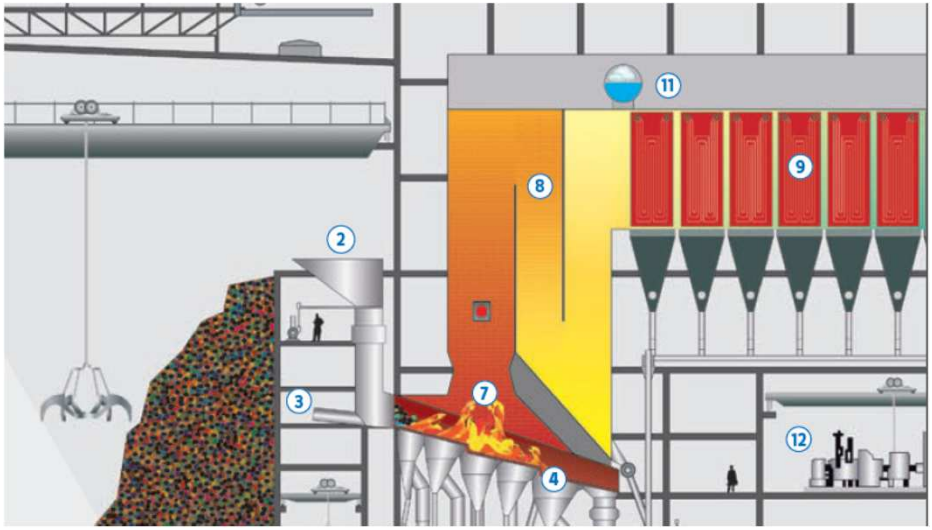
Scope of Iranian partner

- Water-Steam Cycle
- Infrastructure
- Electrical Systems
- Civil Works
- I & C System
- Balance of Plant

Customer Requirements & SBENG Solutions



Grate Incineration & Municipal Solid Waste



Technology

- Forward moving grate
- Capacity: 4 to 50 t/h
- LHV [MJ/kg]: 6 - 20
- Waste types that can be processed
  - Municipal solid waste
  - Refuse derived fuels
  - Industrial waste
  - Bulky waste

<u>As add on</u>:

- Biomass
- Sewage sludge
- Tyres etc.

References (selected examples)

Newest plants

City/ Country	Fuel	Capacity [1000 t] p.a.	Start-up Year
Vilnius/ Lithuania	RDF, MSW, sew.	224	2019
Delfzijl/ The Netherlands	RDF, MSW, sew.	144	2018
Linköping/ Sweden	MSW & Biomass	242	2016
Tampere/ Finland	MSW & Biomass	160	2015

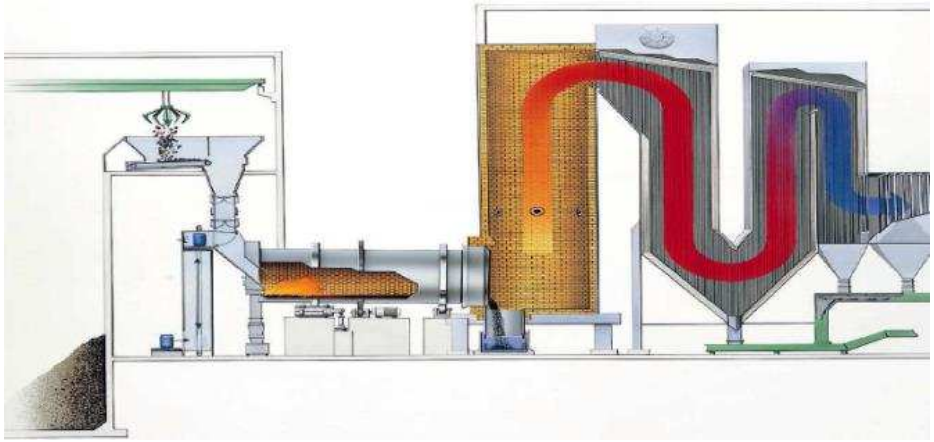
Largest plants

City/ Country	Fuel	Capacity [1000 t] p.a.	Start-up Year
Naples/ Italy	RDF	648	2009
Cologne/ Germany	MSW	572	1997
Hamburg Rug./ Germany	MSW	344	1999
Heringen/ Germany	RDF	320	2009
Berlin Ruhl./ Germany	MSW	288	2012
Herten/ Germany	MSW	278	2008

Largest incineration lines

City/ Country	Fuel	Capacity t/h	Start-up Year
Berlin Ruhl./ Germany	MSW	36,0	2012
Klaipeda/ Lithuania	MSW	34,0	2013
Berlin Rued./ Germany	RDF	32,9	2008
Linköping/ Sweden	MSW & Biomass	30,2	2016

Rotary Kiln & Hazardous Waste



Technology

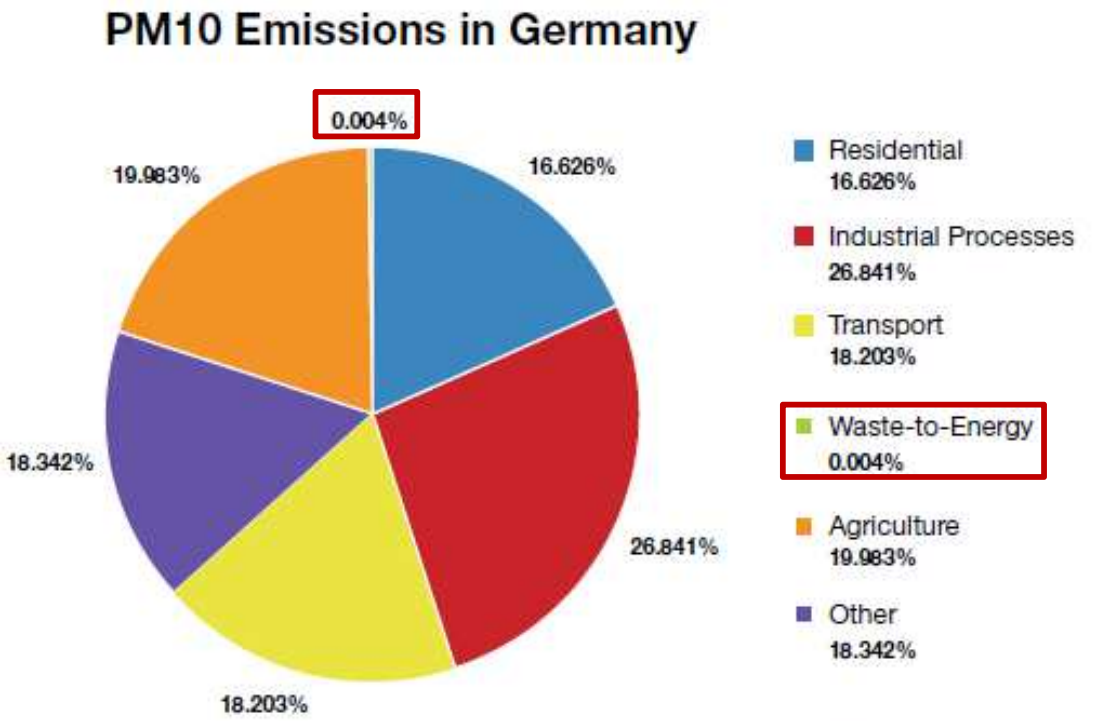
- Rotary kiln
- Capacity: 3 to 16 t/h
- Incineration temperature: 1100°C (>2 s)
- Hazardous waste types processed in various forms (solid, pasty, liquid)
  - Industrial
  - Hospital
  - Animal etc.

Location	Country	Fuel	No. of Units	Cap. per line [t/h]	Capacity [Ths. t/a]	Start-up
Sodegaura City	Japan	Industrial waste	1	15,50	124	2008
Fenice Melfi	Italy	Industrial waste	1	5,00	40	2000
Ulsan	South-Korea	Industrial waste	2	6,25	100	1999
Pusan	South-Korea	Industrial waste	2	7,30	117	1998
Brunsbüttel	Germany	Industrial waste	1	5,00	40	1997
Wolfen	Germany	Wood	1	16,00	128	1997
Marl	Germany	Industrial waste	1	7,00	56	1997
Zapfendorf	Germany	Wood	1	6,70	54	1997
Böhlen	Germany	Industrial waste	1	3,30	26	1997
Krefeld	Germany	Industrial waste	1	5,00	40	1996
Swan Hills/Alberta	Canada	Industrial waste	1	5,00	40	1993
McIntosh, Alabama	USA	Industrial waste	1	2,80	22	1993
St. Gabriel, Louisiana	USA	Industrial waste	1	2,80	22	1993
Leverkusen	Germany	Industrial waste	1	3,95	32	1992

Environmental Security
German Emission Standard

Environmental Impact of Energy from Waste Plants in Germany

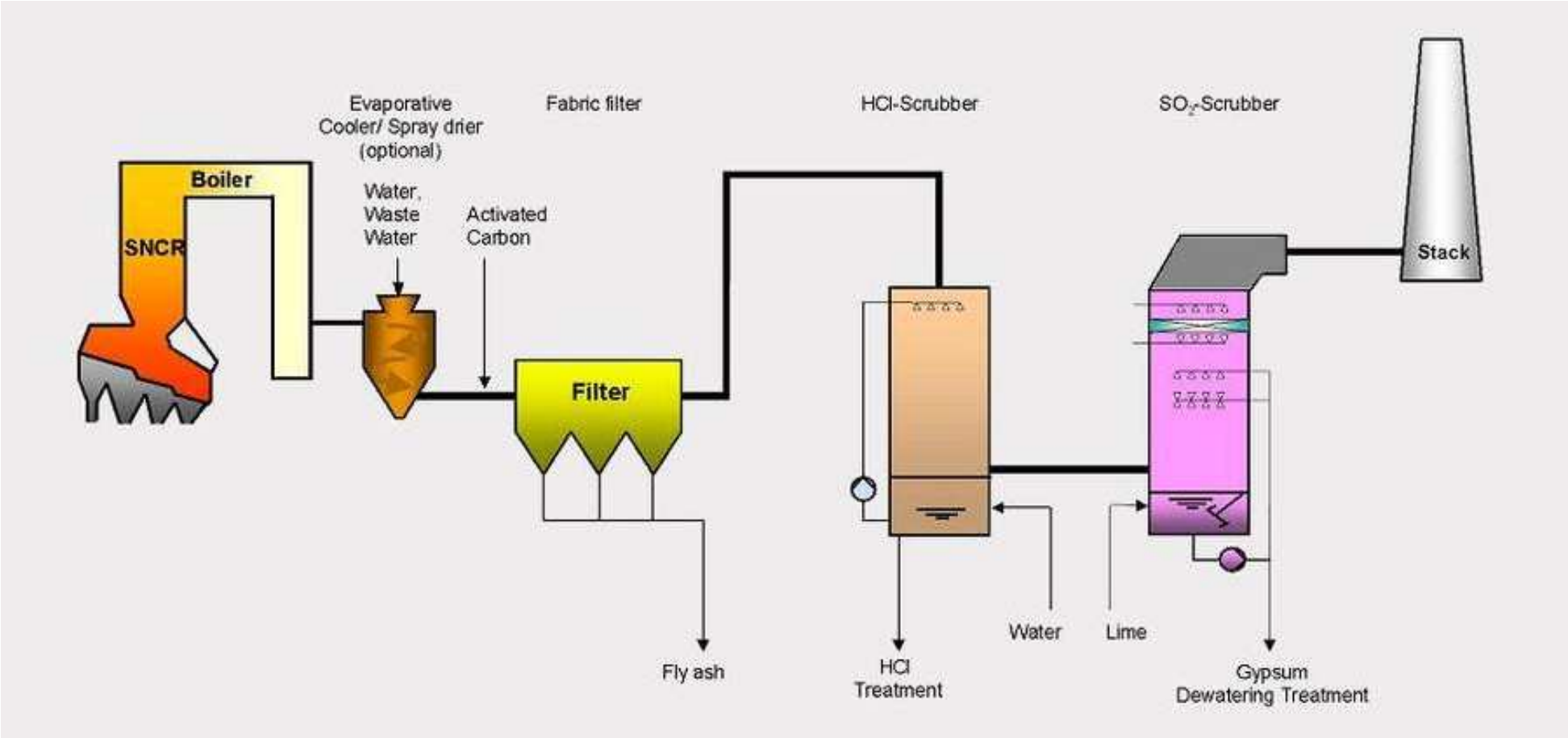
- Germany has got nearly 100 waste incineration plants; more than all other European countries except France
- German emission standards are more strict than European ones
- Nevertheless, pollution by such plants is negligible (see example on dust/ particulate matters)



Source: German Environmental Agency, National Trend Tables 1990-2010, 2010 values.

Environmental Security
SBE Flue Gas Cleaning Solutions

SBE covers a large variety of flue gas cleaning concepts to comply with emission thresholds and country-specific requirements all over the world

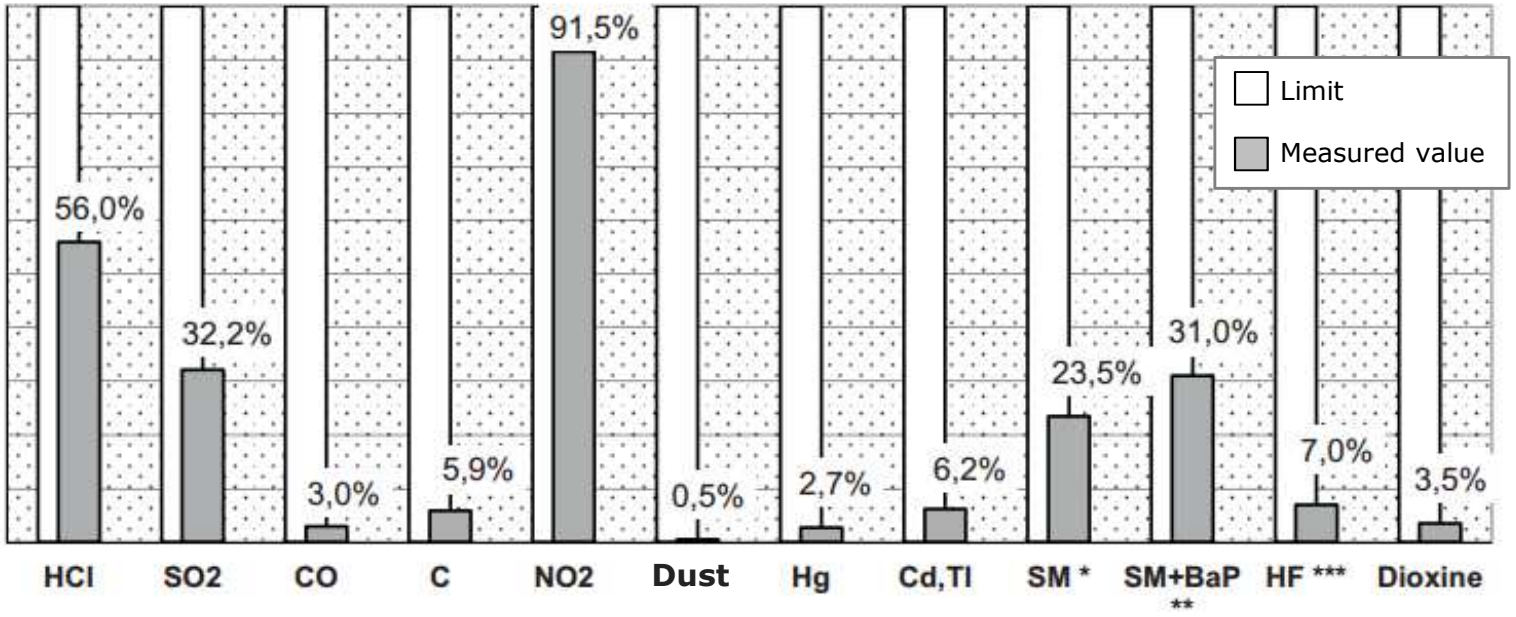


Environmental Security

Example: Plant in Ruhleben/ Berlin (SBE ref.)

Source: Official Journal of Berlin Municipality, 66. Vol., No. 31, Berlin, 5 August 2016

Annual Average of continuous/ discontinuous Emission Measurement 2015



Limit acc. to German legislation 17. BImSchv (daily average in mg/m³ except Dixons in ng/m³)											
10	50	50	10	100	10	0,03	0,05	0,5	0,05	1	0,1
Measured values in 2015 (mg/m³ except Dixons in ng/m³)											
5,6	16,09	1,48	0,59	91,49	0,05	0,00082	0,0031	0,1174	0,0155	0,07	0,0035

continuous measurement ← → discontinuous measurement

* SM : Total amount of heavy metals: Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V, Sn

** SM + BaP : Total amount of heavy metals: As, Cd, Cr, Co und Benzo(a)phyren

*** HF : Value for Line A