



Partenope
Ambiente
Gruppo a2a

WTERT



Waste-to-Energy Research
& Technology Council

Advancing Sustainable Waste Management

WTERT 2010 Bi-Annual Meeting at Columbia University

NEW YORK CITY, October 7 & 8, 2010



How WTE is contributing
to solve the waste management
crisis in Naples, Italy

Antonio Bonomo

Director, Energy Generation

A2A spa

Brescia - Italy

NEAPLES, Plebiscito square



CAPRI

faraglioni

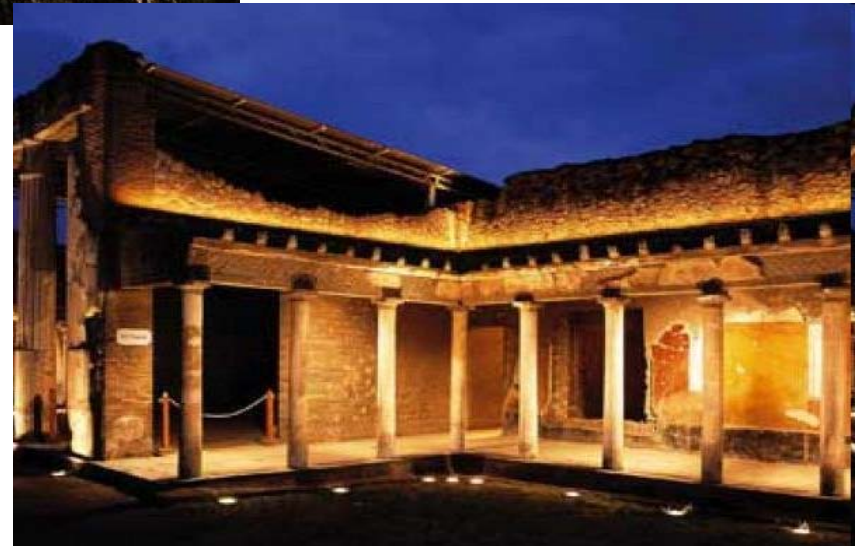


piazzetta

**Tiberio emperor villa
(27-37 a.C.)**



POMPEI (Vesuvio eruption 79 a.C.)



VESUVIO volcano



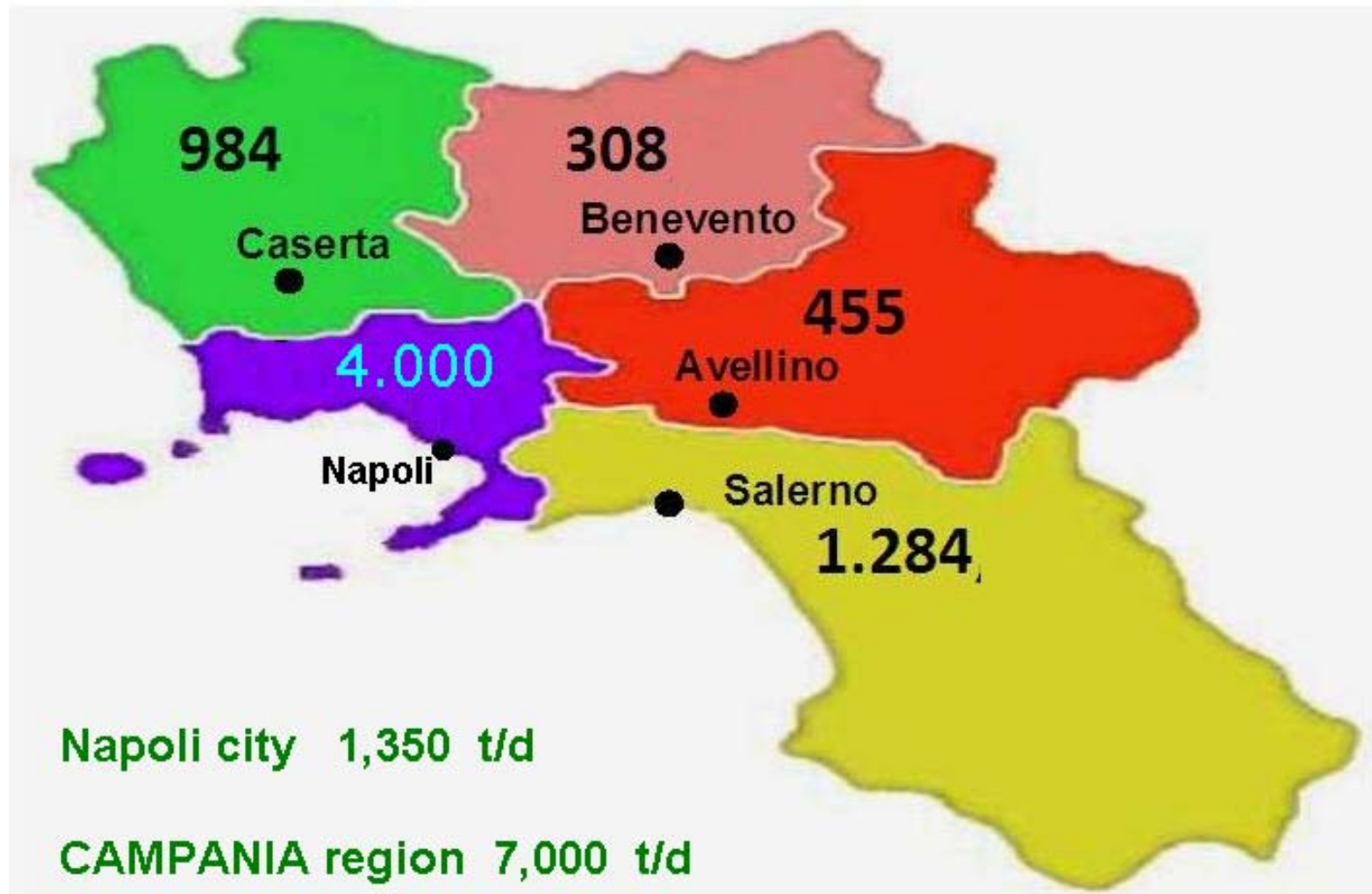


waste crisis 2007





CAMPANIA: MSW DAILY PRODUCTION (tons)



WTE ACERRA



CAMPANIA MUNICIPAL WASTE SYSTEM

- **COLLECTION** (with recyclables source separation)
- **PRETREATMENT IN 7 “S.T.I.R” PLANTS**
- **WASTE TO ENERGY (ACERRA) OF DRY FRACTION**
- **STABILIZATION & LANDFILLING OF WET FRACTION**

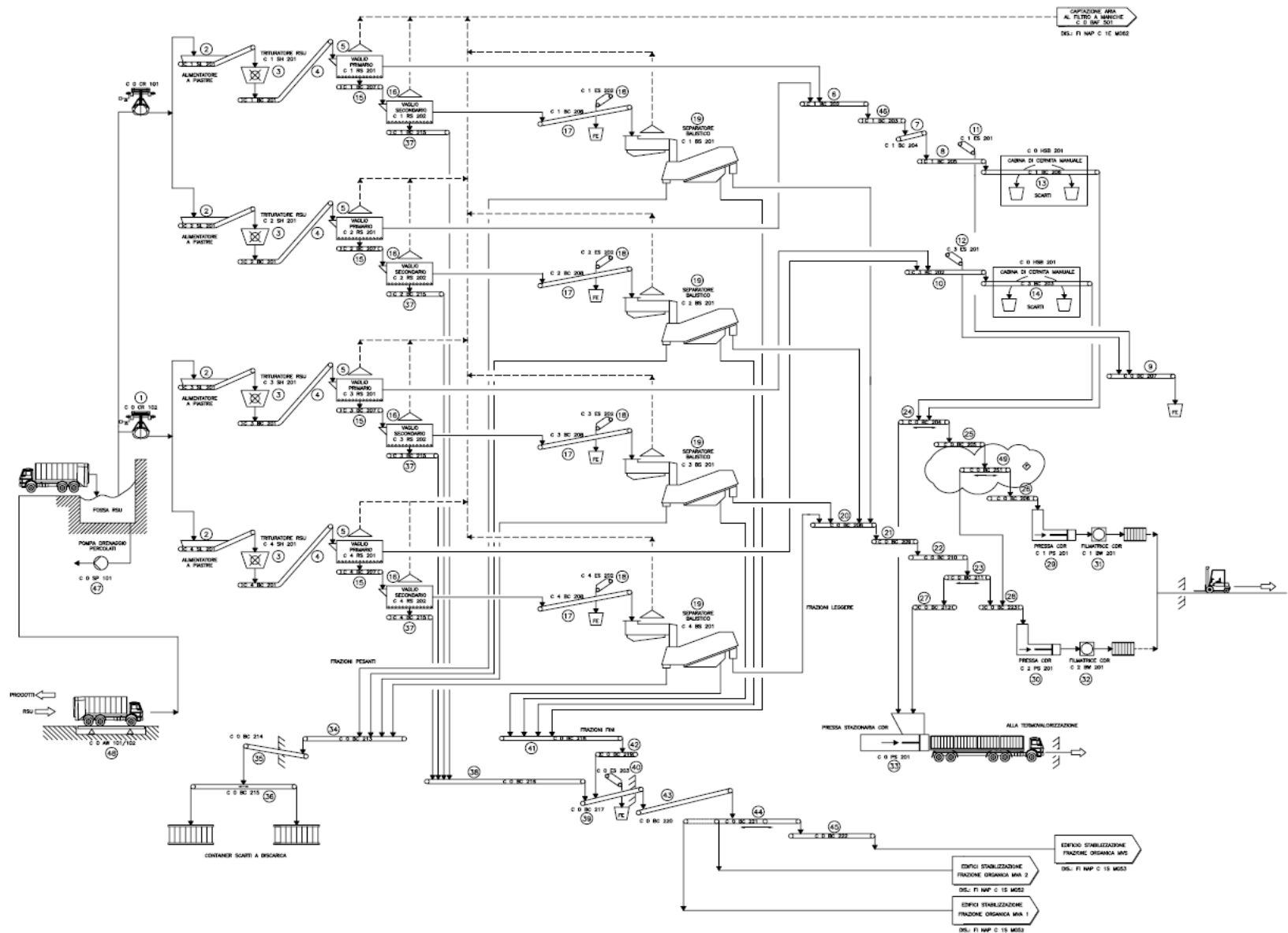
SHORT HISTORY OF CAMPANIA WASTE EMERGENCY

- **2/1994** extraordinary Commissioner to waste emergency
- **7/1997** Campania waste management plan (BioMechanical Treatment + RDF + WTE + landfill)
- **1999** Starting of construction of 7 “CDR” (Refuse Derived Fuel) plants
- **2000-2001** starting production of RDF “ecoballs” (7 Mtons accumulated at 2010)
- **2004** starting construction of Acerra WTE
- **2004-2008** many problems arise (legal, technical, public opinion, etc.)
- **13/11/08** 15 years contract for Acerra WTE O&M signed with A2A
- **18/3/09** 1st waste firing
- **12/5/09** 1st electric power generation
- **jan-feb 2010** WTE acceptance tests
- **1/3/2010** starting of Partenope Ambiente (A2A group) WTE industrial operation

CAIVANO waste pre-treatment plant



CAIVANO waste pre-treatment plant: process diagram



“Ecoballs” storage



CAIVANO waste pre-treatment plant



WASTE TO ENERGY A2A GROUP

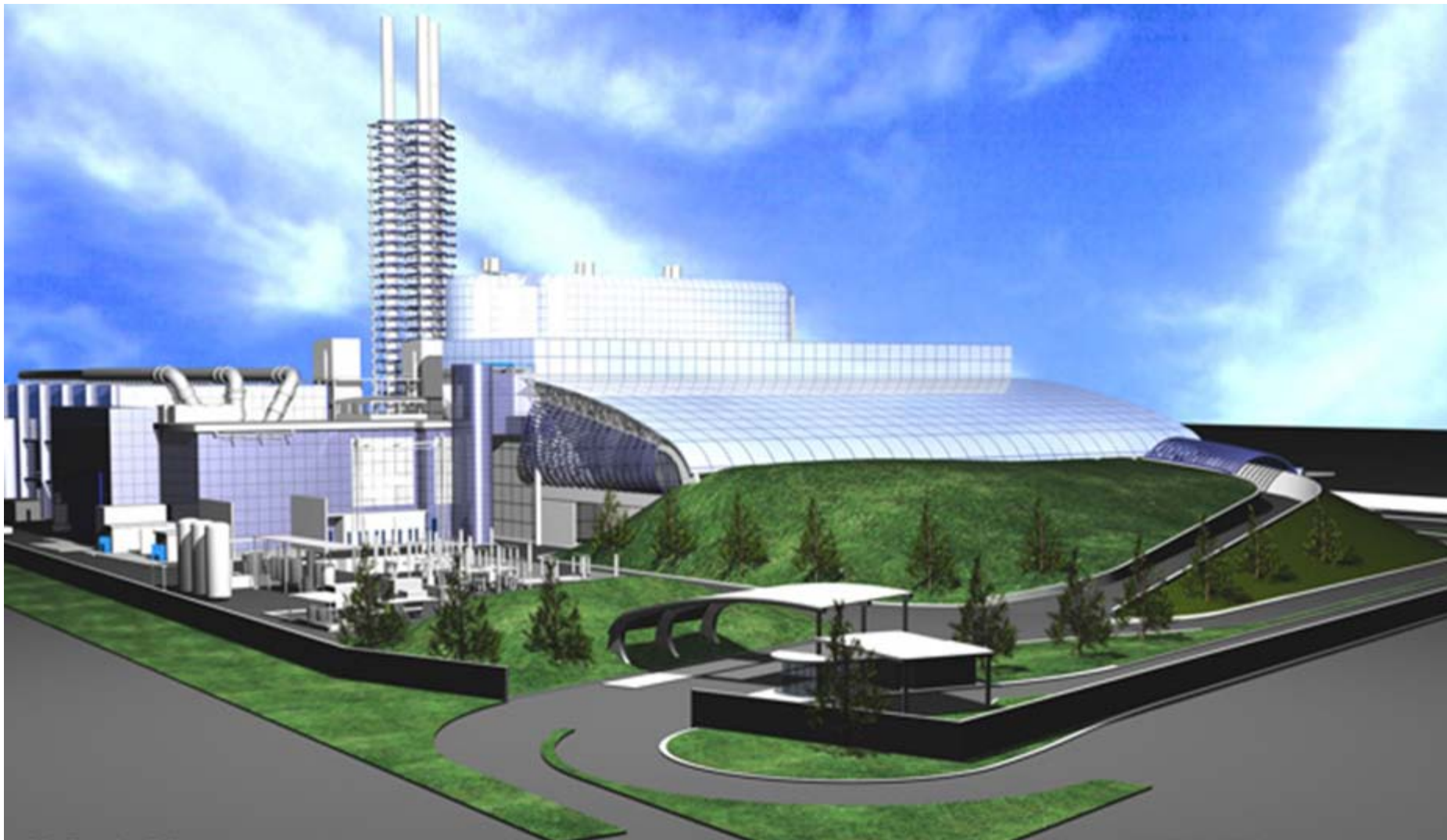


BRESCIA (800.000 t/y)



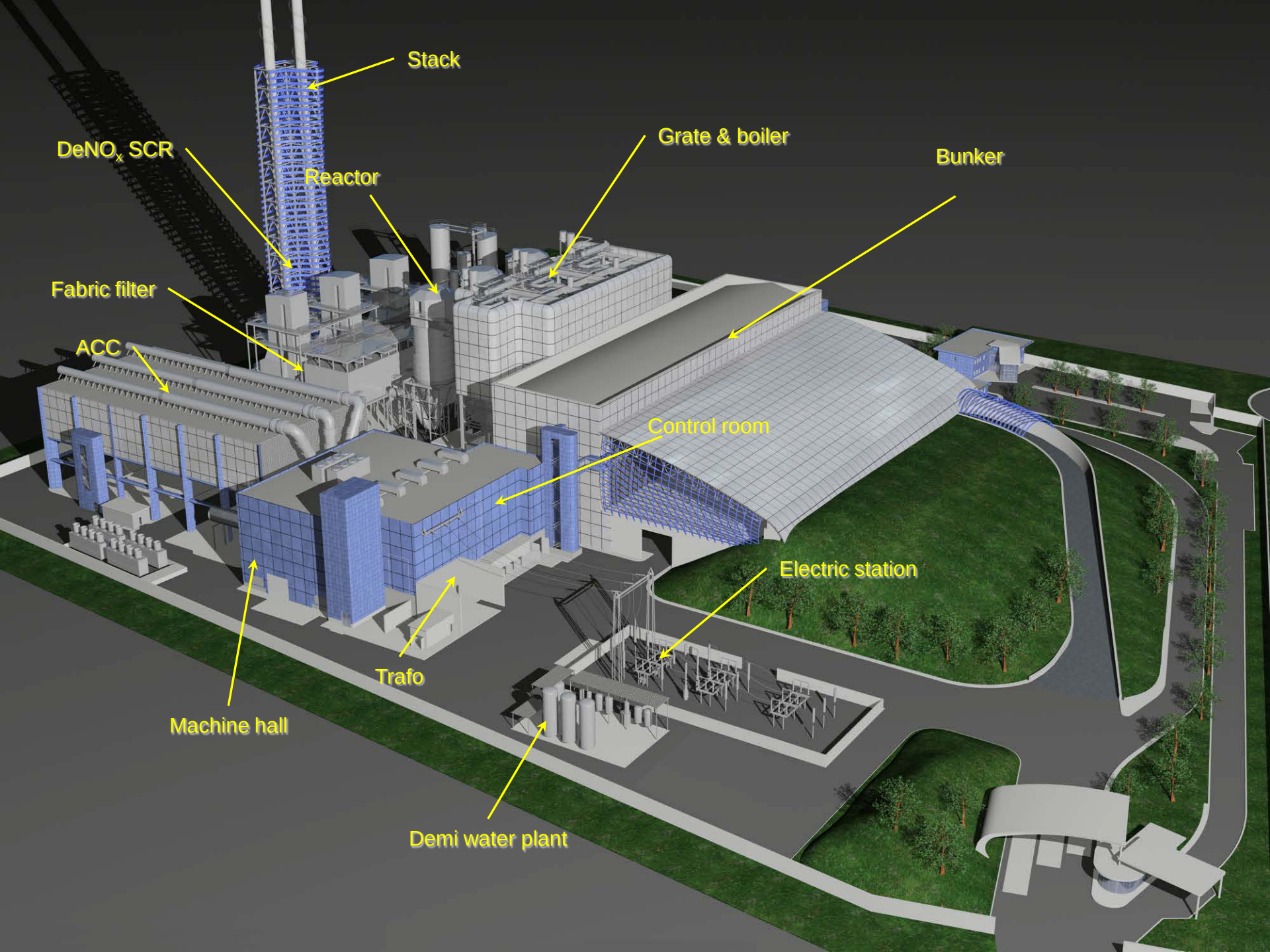
MILANO (500.000 t/y)

WTE ACERRA



ACERRA WTE PLANT: TECHNICAL DATA

• N° Boiler Unit	3	
• Total Waste Combustion Capacity	1.950	ton / d
	600.000	ton / y
• Total Combustion Thermal Power (PCI = 15.000 kJ/kg)	340	MW _{th}
• Total Steam Production (500°C, 90 bar)	380	ton / h
• Gross electric power (100 % MCR)	107,5	MW _e
• Net electric power (100 % MCR)	91,8	MW _e



Stack

DeNO_x SCR

Reactor

Grate & boiler

Bunker

Fabric filter

ACC

Control room

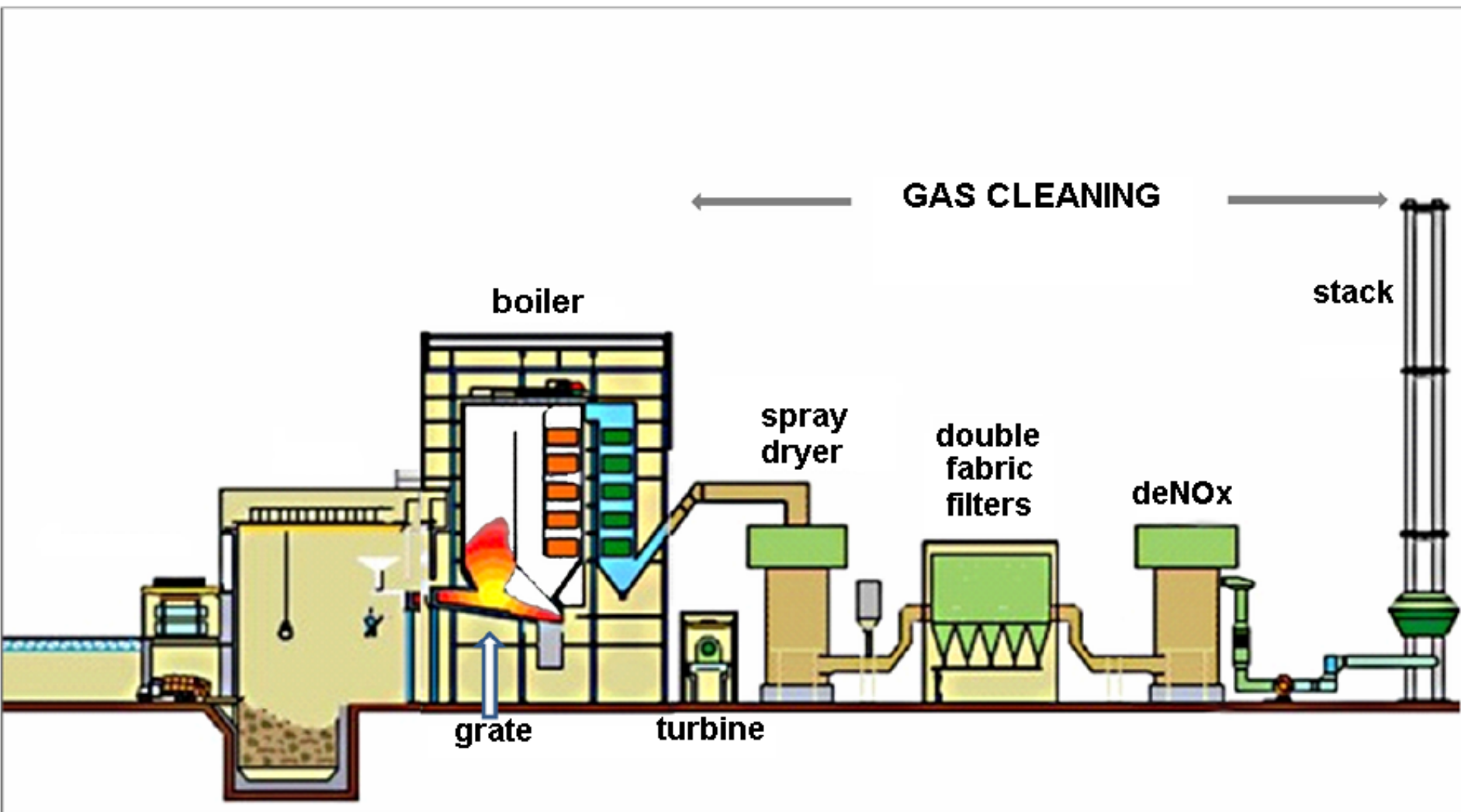
Electric station

Trafo

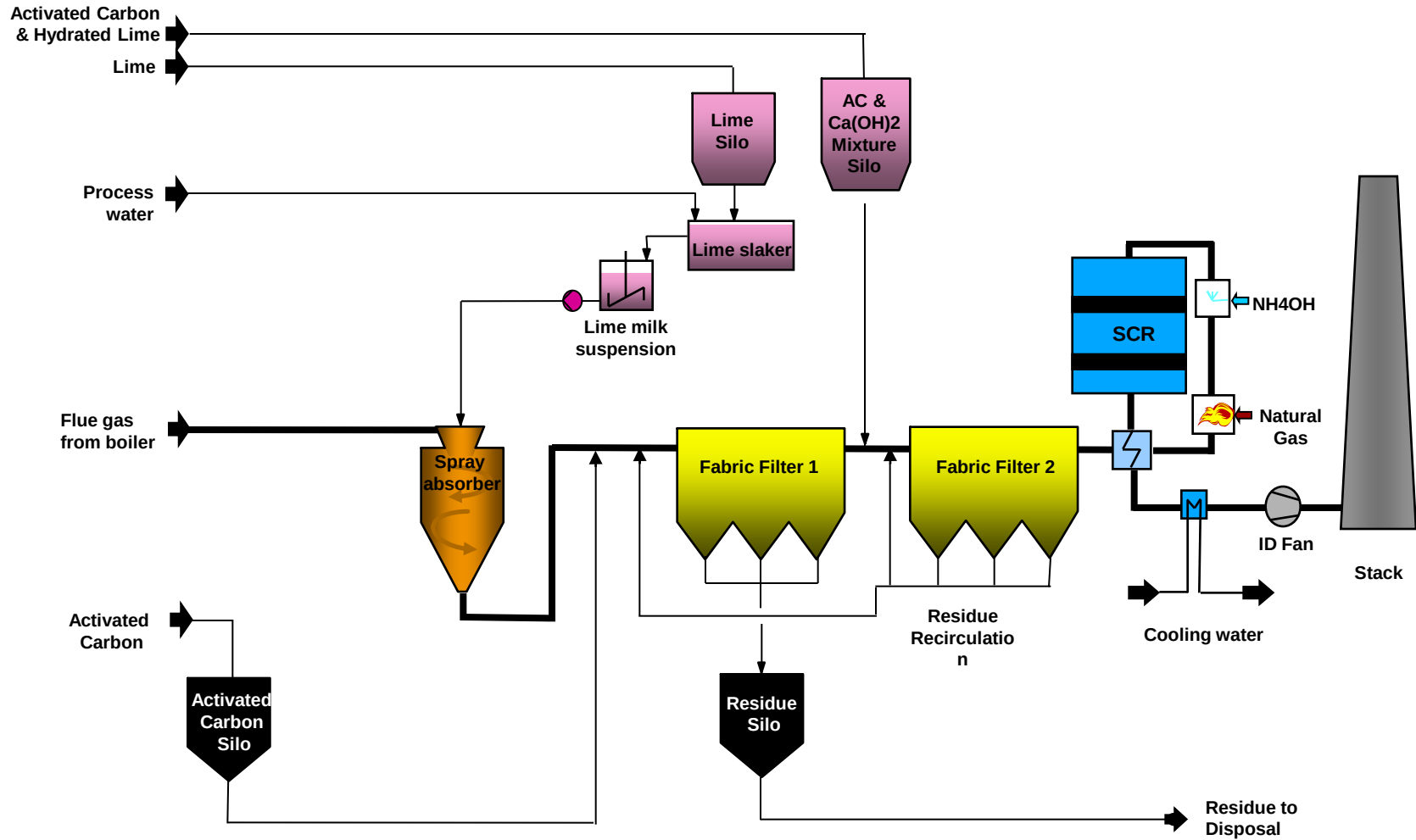
Machine hall

Demi water plant

ACERRA WTE PLANT: FUNCTIONAL SECTION



ACERRA Gas Cleaning



WTE ACERRA

Highlights:

- | | | |
|--------------------------------------|-------|------|
| 1. LARGE POWER GENERATION: | 107,5 | MWeI |
| 2. HIGH STEAM DATA | 90 | bar |
| | 500 | °C |
| 3. HIGH NET ELECTRIC EFFICIENCY | 27 | % |
| 4. DOUBLE FABRIC FILTER GAS CLEANING | | |
| 5. FULL BOTTOM ASH RECYCLING | | |

WTE ACERRA

OPERATION DATA 2010

at sept. 30th:

- **waste treated** **400.000 t**
- **net electricity generated** **351 GWh**
(yearly demand of 137.000 families)

WTE ACERRA – emission limits

<i>Component</i>		European Directive 2000/76/CE	guaranteed values	Reduction %
SO_x	mg/Nm³	50	25	- 50
HCl	“	10	7	- 30
HF	“	1	0,3	- 70
NO_x	“	200	85	- 57,5
Dust	“	10	3	- 70
CO	“	50	50	-
TOC	“	10	5	- 50
Cd+Tl ⁽²⁾	“	0,05	0,02	- 60
Hg ⁽²⁾	“	0,05	0,02	- 60
Heavy metals ^{(2) (3)}	“	0,5	0,2	- 60
I.P.A. (idrocarburi policiclici aromatici) ⁽⁴⁾	“	0,01	0,01	-
PCDD+PCDF (teq) ⁽⁴⁾	ng/Nm³	0,1	0,025	- 75
(1) Daily averages, dry, O₂ = 11 % vol. (2) Sampling : 1 hour (3) Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V + Sn (4) Sampling : 8 hours				

WTE ACERRA – emission values – april 2010



ISCRIZIONE NELL'ELENCO DEI LABORATORI DELLA REGIONE EMILIA ROMAGNA AL N° 008/RN/002
 LABORATORIO ALTAMENTE QUALIFICATO D.M. 26-2-87 ART. 4 – LEGGE 46/82
 PER LA RICERCA APPLICATA E INNOVAZIONE TECNOLOGICA
 LABORATORIO ACCREDITATO SINAL N° 0181
 AZIENDA CON SISTEMA DI GESTIONE PER LA QUALITÀ CERTIFICATO DA DNV UNI EN ISO 9001
 AZIENDA CON SISTEMA GESTIONE AMBIENTALE CERTIFICATO DA DNV UNI EN ISO 14001

	Unità di misura	Linea 1	Linea 2	Linea 3	Limiti A.I.A.	Limite Direttiva Europea/ Dlgs 133/2005
Polveri totali	mg/Nm ³	0.29	0.47	0.39	3	10
Monossido di carbonio (CO)	mg/Nm ³	12.4	14.6	28.1	50	50
Ossidi di zolfo (espressi come SO₂)	mg/Nm ³	1.4	1.2	5.5	25	50
Ossidi di azoto (espressi come NO₂)	mg/Nm ³	56	32	49.6	85	200
Acido cloridrico (HCl)	mg/Nm ³	0.7	1.3	4.1	7	10
Acido fluoridrico (HF)	mg/Nm ³	0.08	0.06	0.07	0.3	1
Carbonio Organico Totale (TOC)	mg/Nm ³	0.7	0.4	0.8	5	10
Mercurio e suoi composti (Hg)	mg/Nm ³	0.001	< 0.0001	< 0.0002	0.02	0,05
Cd + Tl	mg/Nm ³	< 0.002	< 0.002	< 0.002	0.02	0.05
Metalli: Sb, As, Pb, Cr, Co, Cu, Mn, V, Ni	mg/Nm ³	0.05	0.04	0.03	0.2	0,5
Idrocarburi Policiclici Aromatici (IPA)*	mg/Nm ³	<0.00001	< 0.00002	<0.00002	0.01	0,01
PCDD + PCDF (TEq)	ng/Nm ³	0.002	0.004	0.002	0.025	0,1

ACERRA WTE - BOTTOM ASH RECYCLING



BOTTOM ASH RECYCLING



BOTTOM ASH RECYCLING



iron – 1st screening



iron - 2nd screening

iron (5 - 15 %)



non ferrous metals:
alluminium, copper, zinc, lead
(0,5 - 2 %)



inert (85 - 95 %) to cement industry

BOTTOM ASH RECYCLING

WTE: A TOOL TO INCREASE MATERIAL RECYCLING

Combustion cleans and separates metals and inerts from mixed waste, producing recyclable bottom ash

Bottom ash amount to 15-25% of MSW

WTE, in addition to recovery of energy from residual waste, is a tool to increase material recycling by further 15-25% of MSW

MUNICIPAL SOLID WASTE IN CAMPANIA

(data 2008 – ISPRA report, march 2010)

what's the future?

MSW PRODUCED	2.723.000 t/a
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SOURCE SEPARATION & RECYCLING (19 %)	518.000 t/a
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UNSORTED WASTE	2.205.000 t/a
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WTE ACERRA	600.000 t/a
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REMAINING TO BE DISPOSED	1.602.000 t/a
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(increased recycling and 2 further WTE plants needed)

25.2.10 ISWA working group Energy recovery at Neaples and Acerra

