

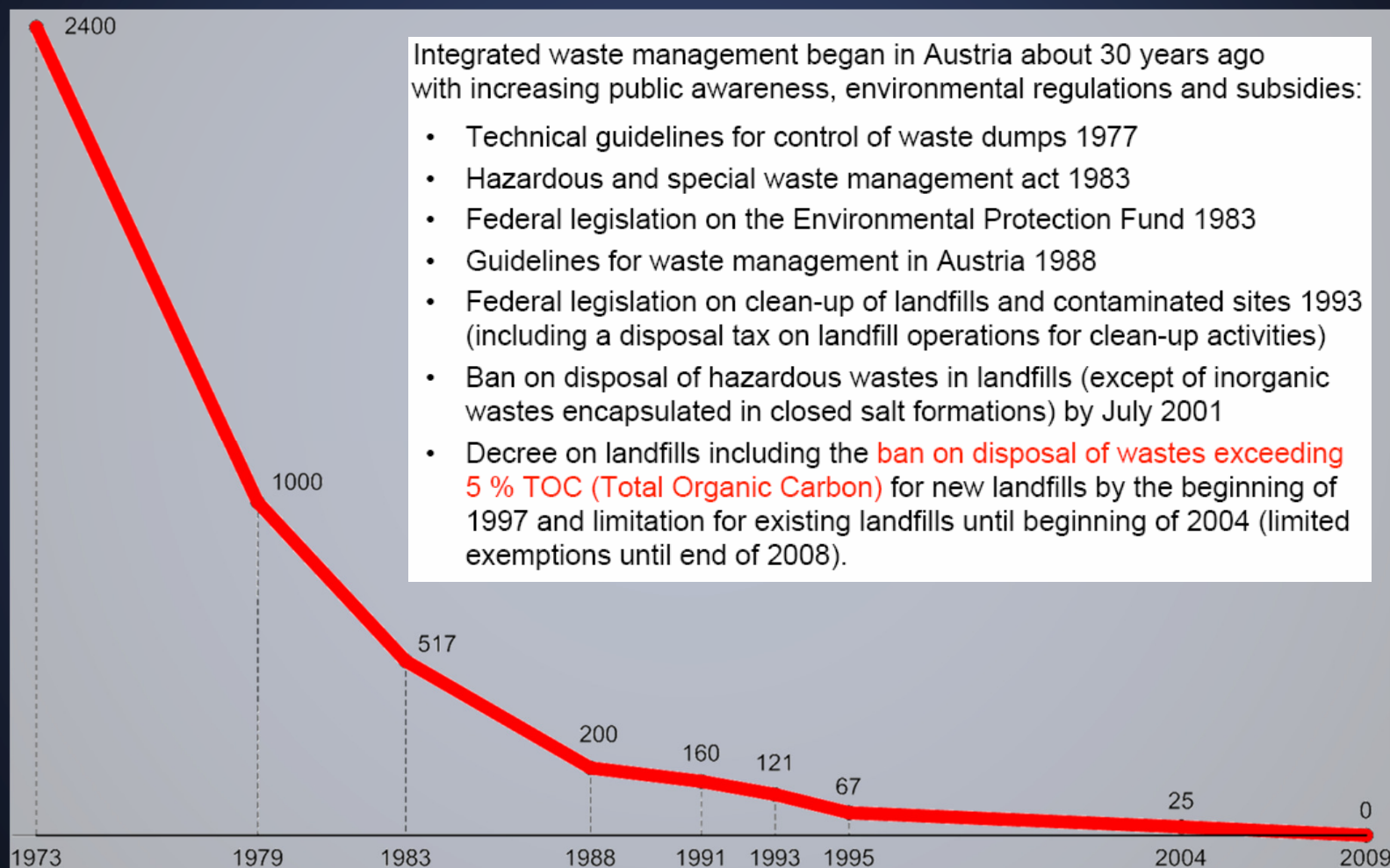
Seminar for FIEP, Federação das Indústrias do Estado do Paraná

Thoughts about the pro's and con's in
the field of waste management and
how to avoid mistakes

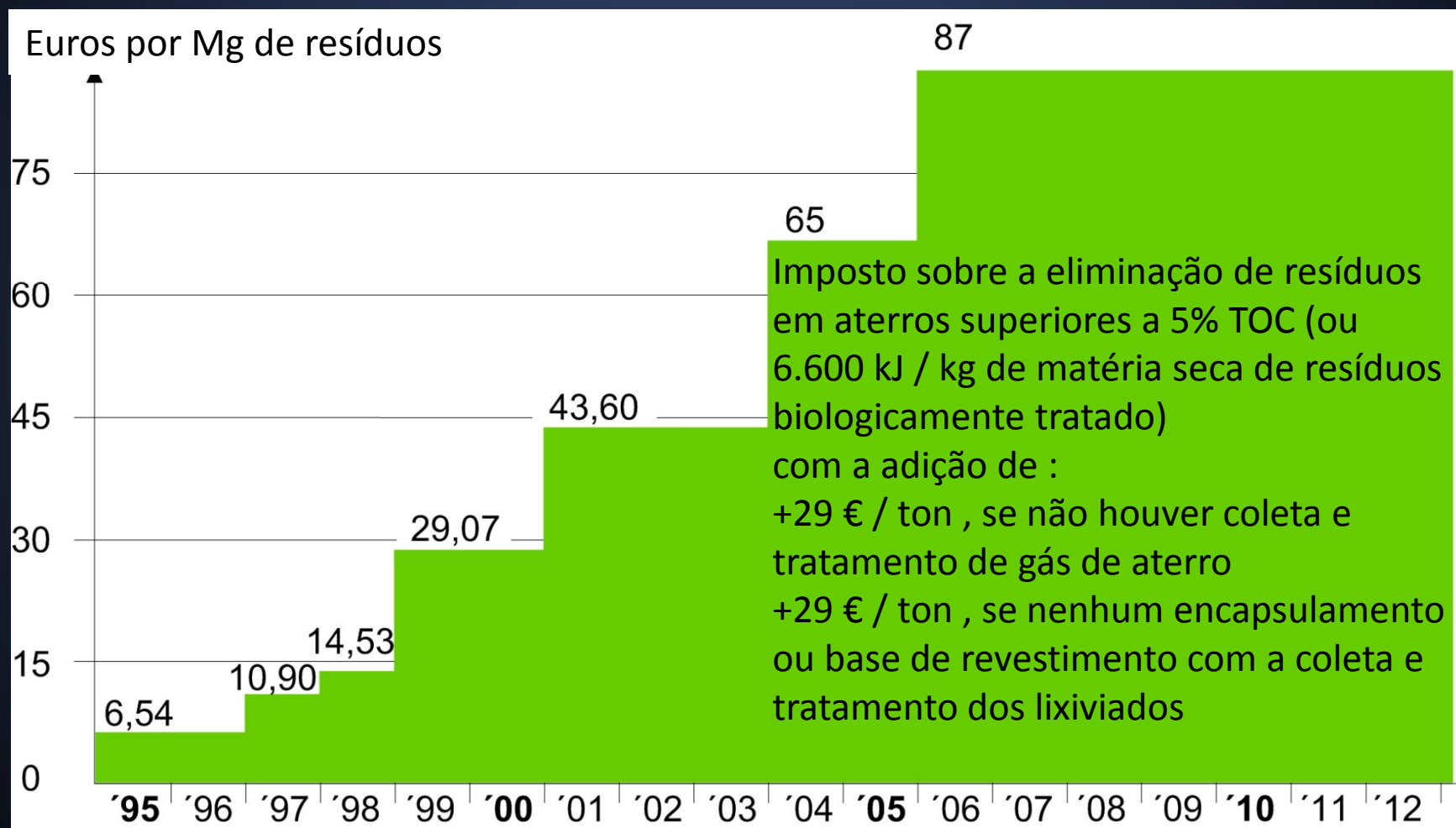
Lisbon, 20. October 2014

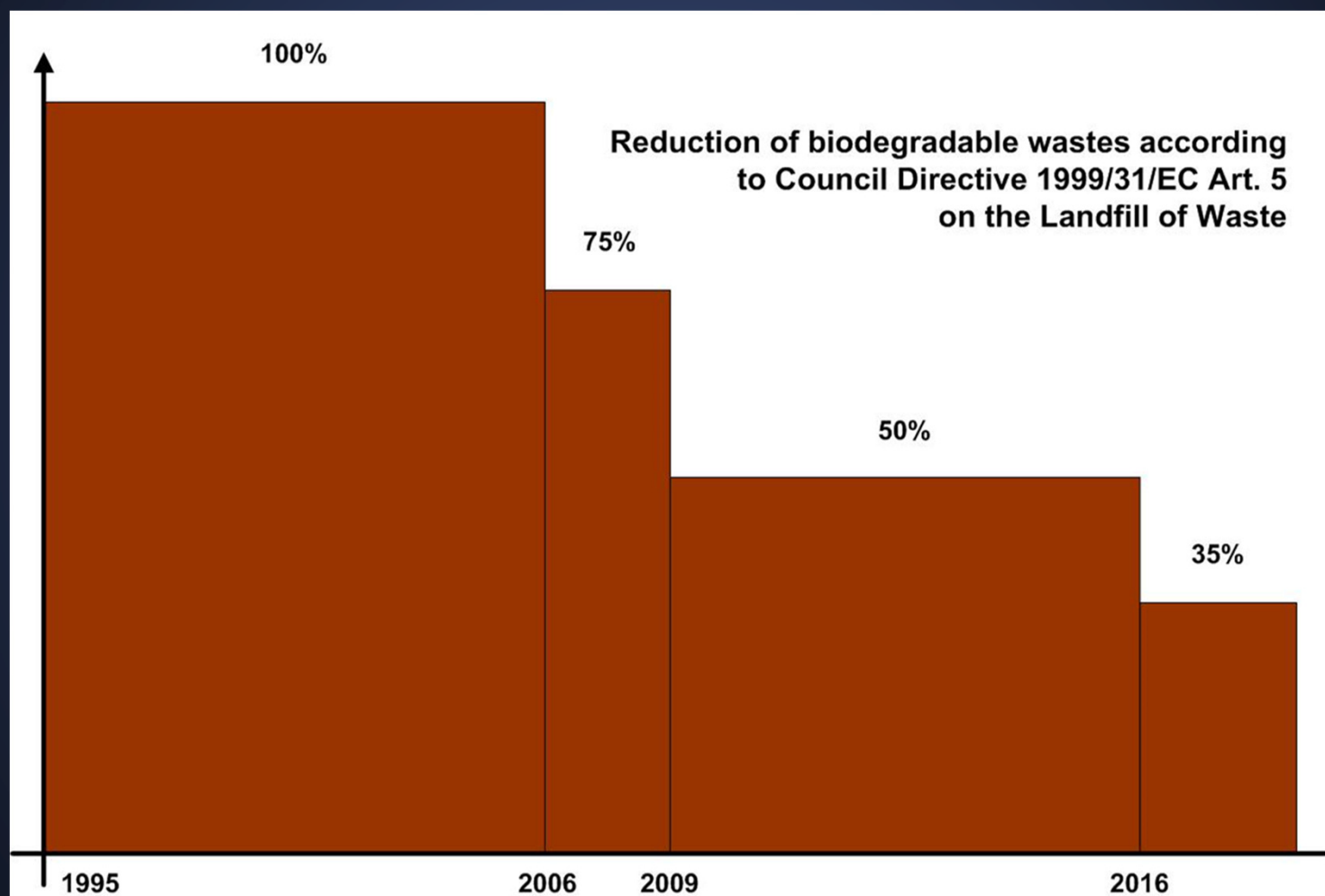
- Motivação para o investimento em gestão de resíduos
- Visão geral das tecnologias utilizadas
- O que é o RDF , fontes de RDF, como preparar, produção, taxas de derrubada
- Eficiência energética
- Referências selecionadas
- Maximizar os benefícios e minimizar os custos

Número de aterros sanitários na Áustria que estão disponíveis para resíduos de combustível



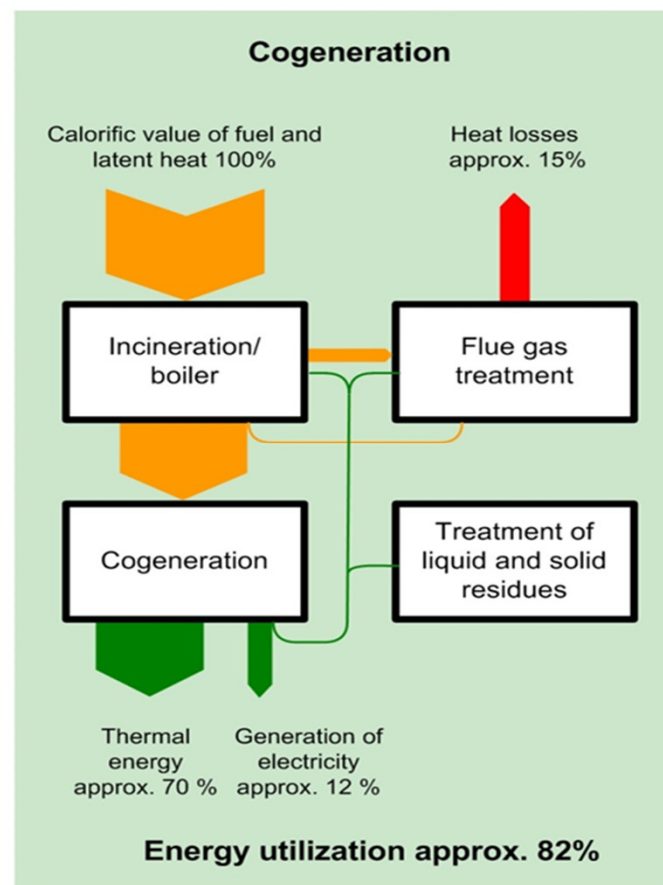
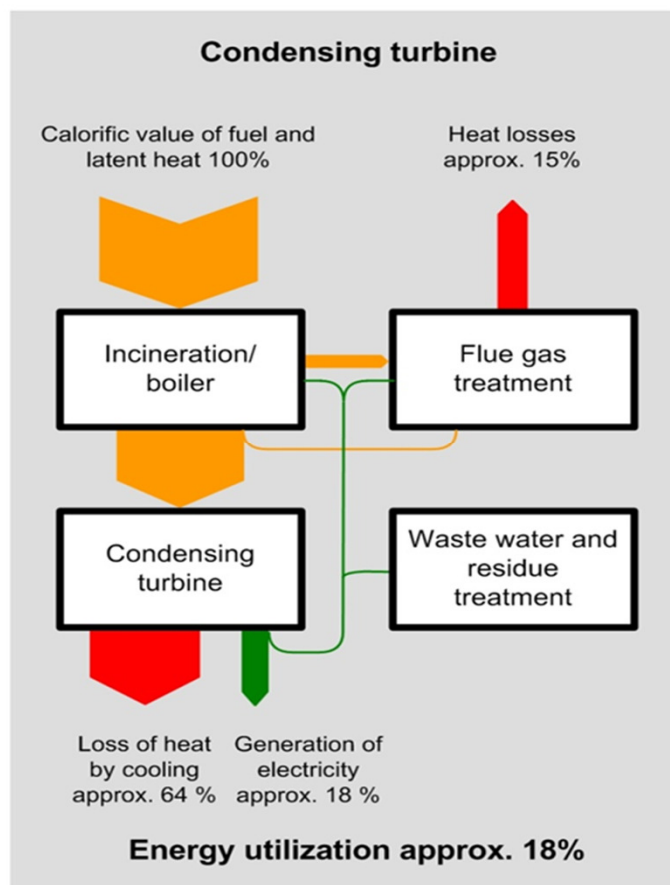
Desenvolvimento de uma taxa sobre os resíduos depositados na Áustria







Site-specific options and limitations for utilization of energy

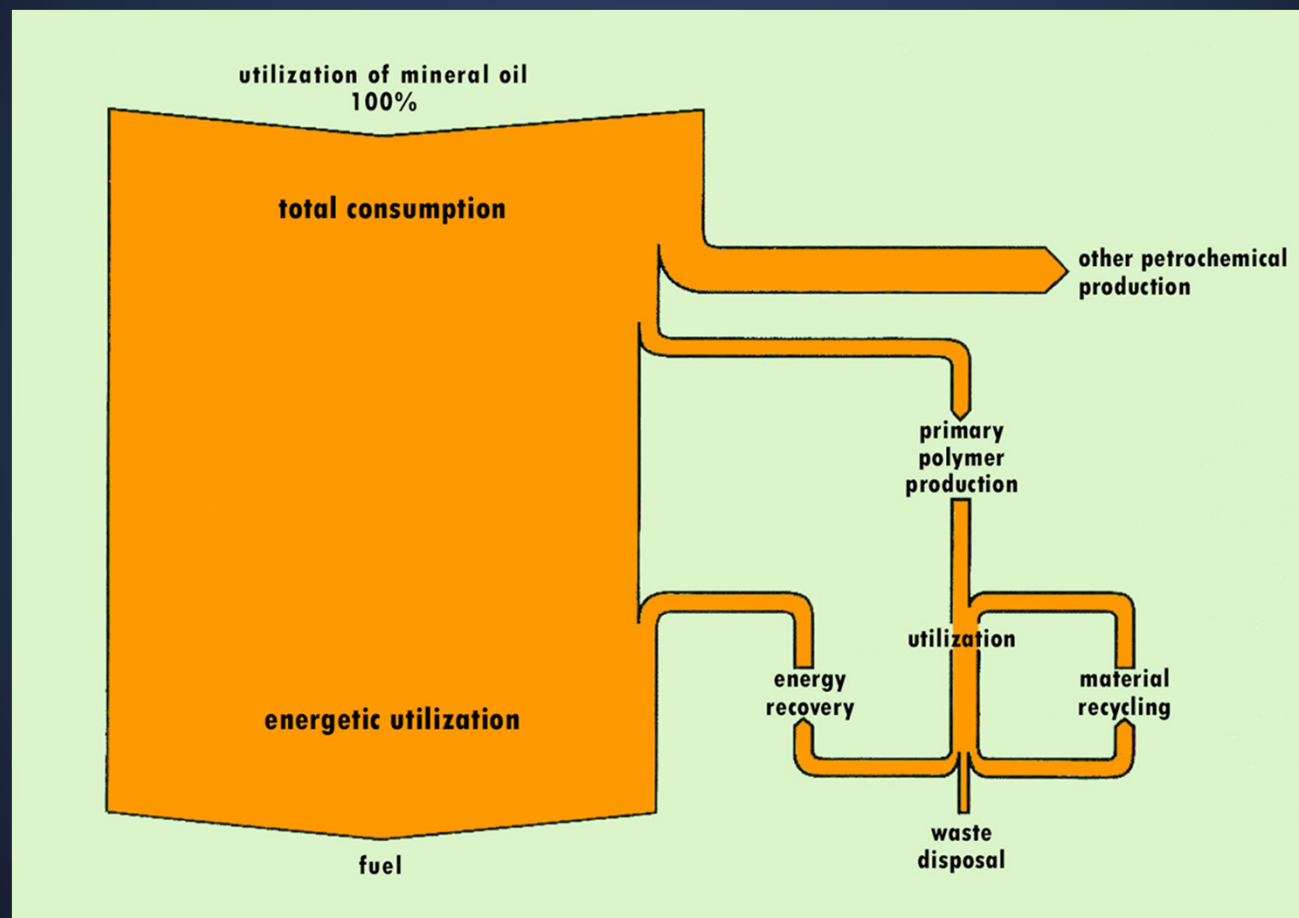


Source: UV&P, 1994

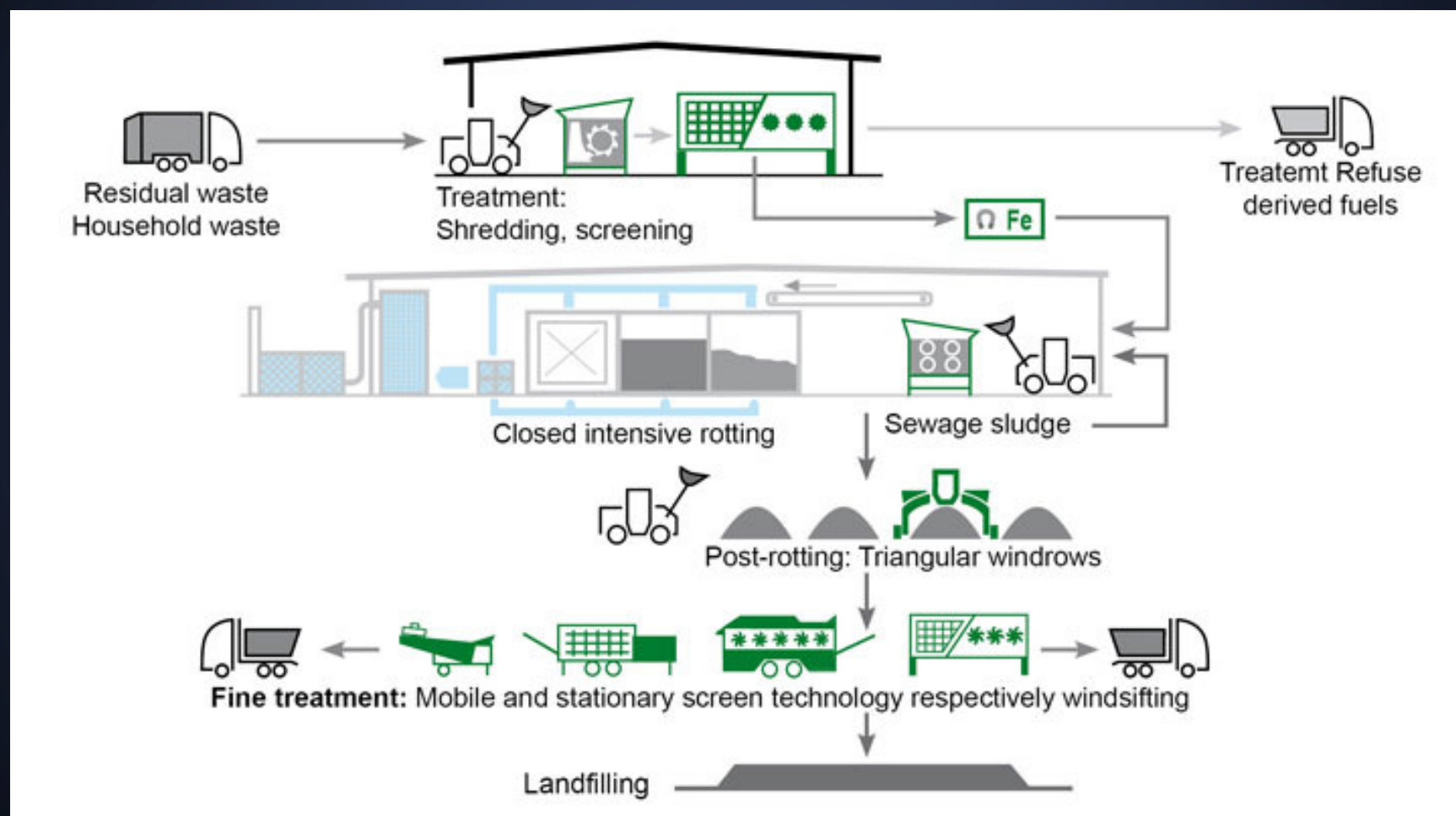


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Utilização de óleos minerais



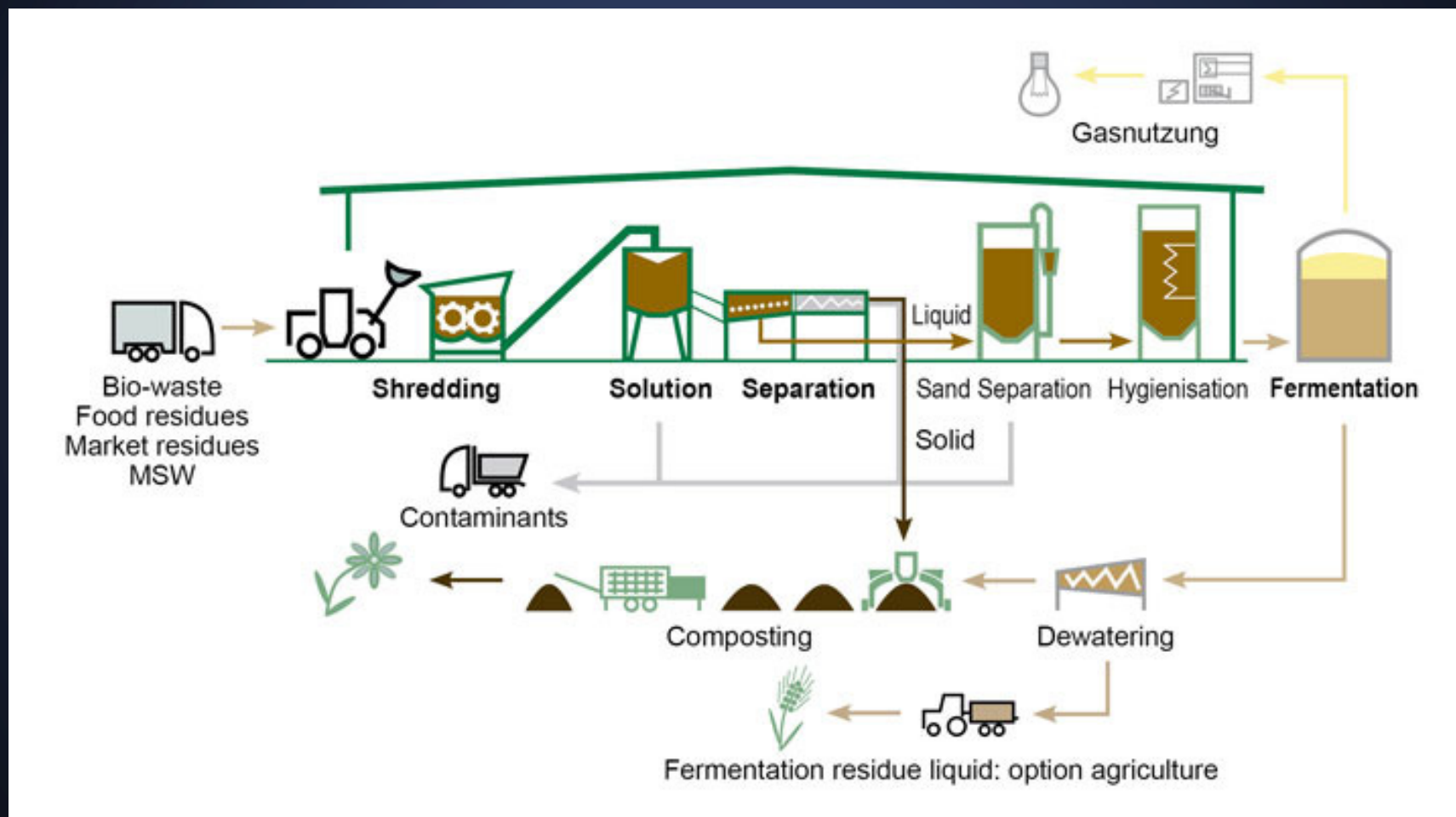
Exemplo de uma estação de compostagem convencional sem produção de energia



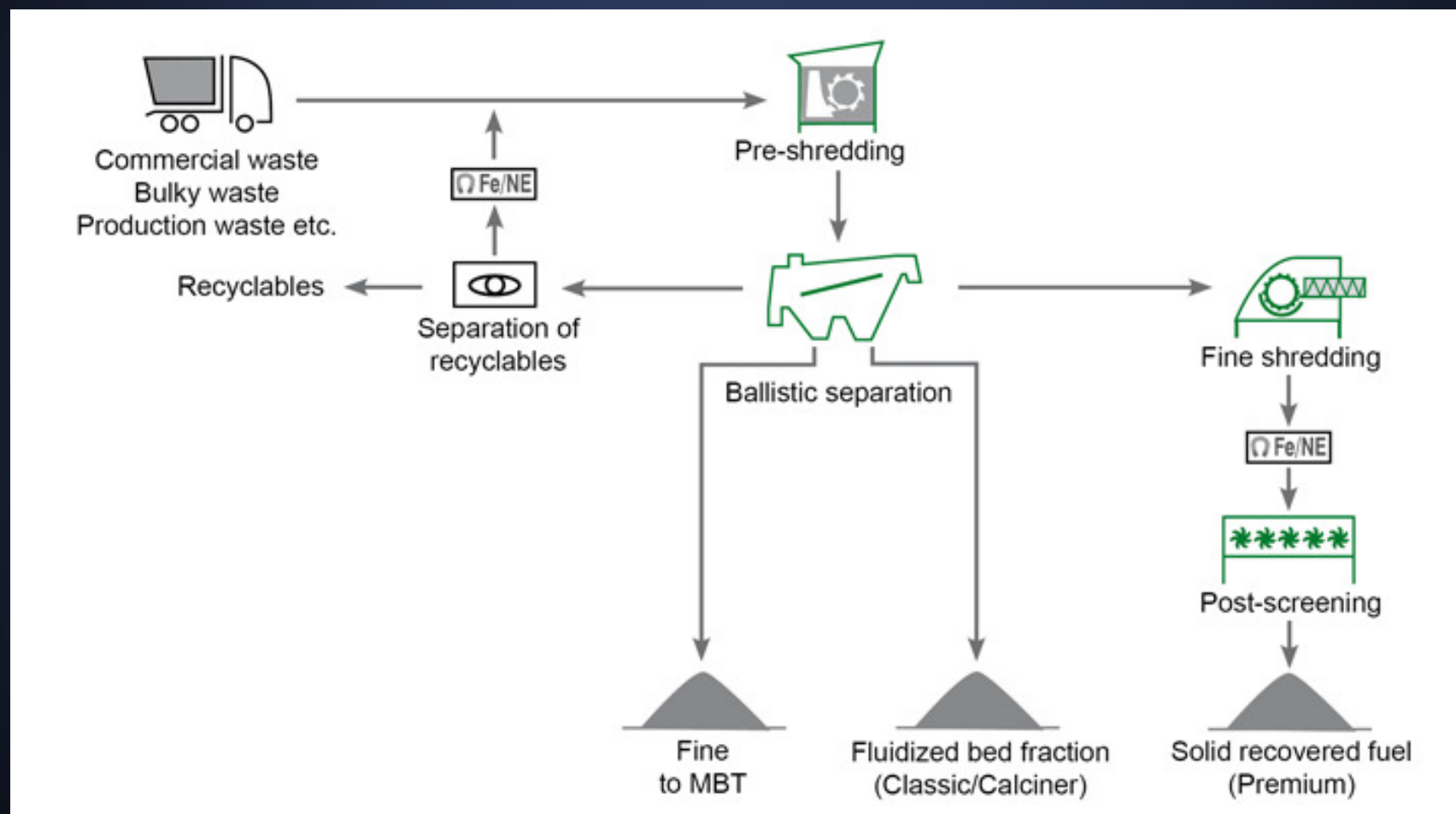


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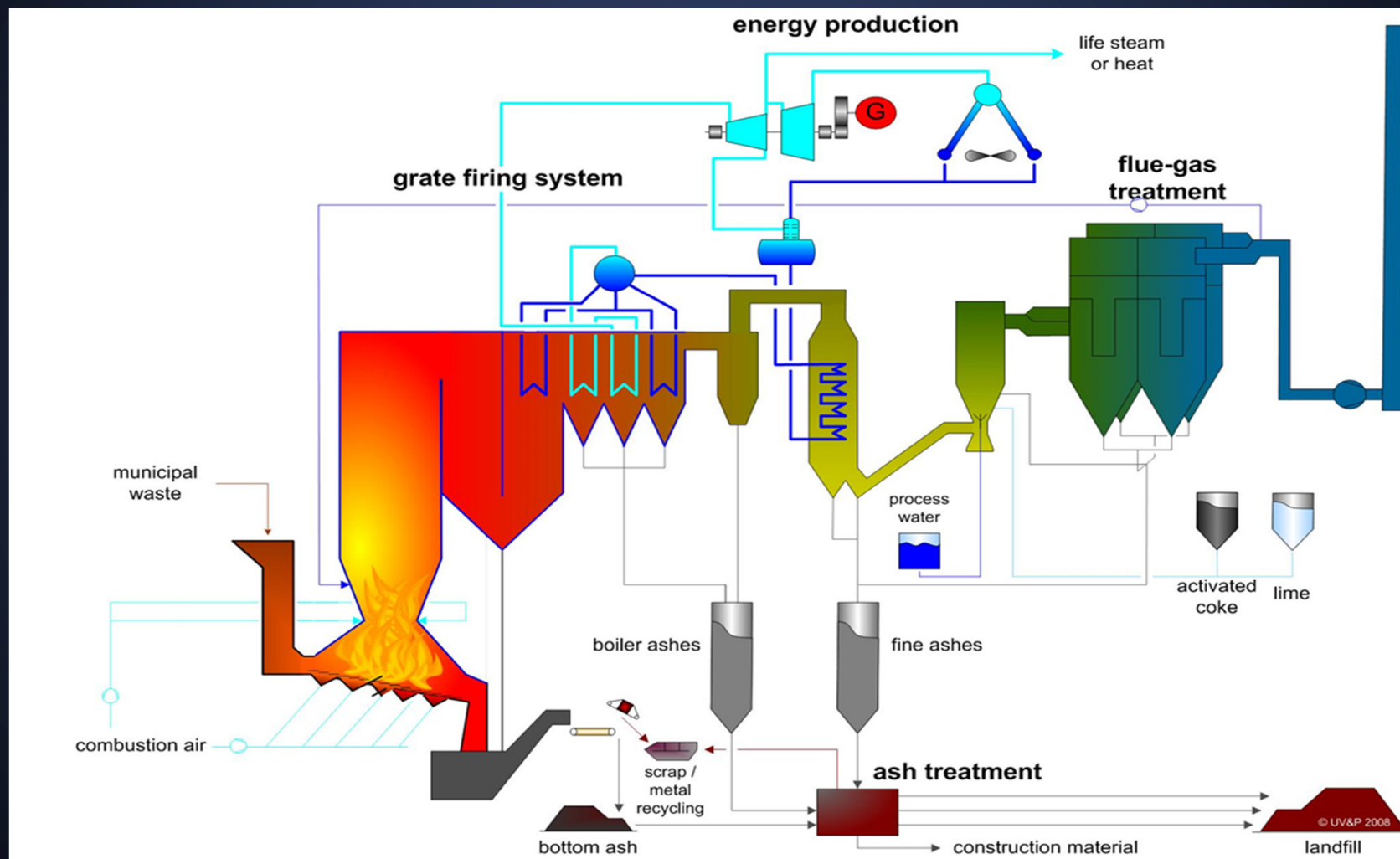
Exemplo de uma estação com sistema de digestão úmida

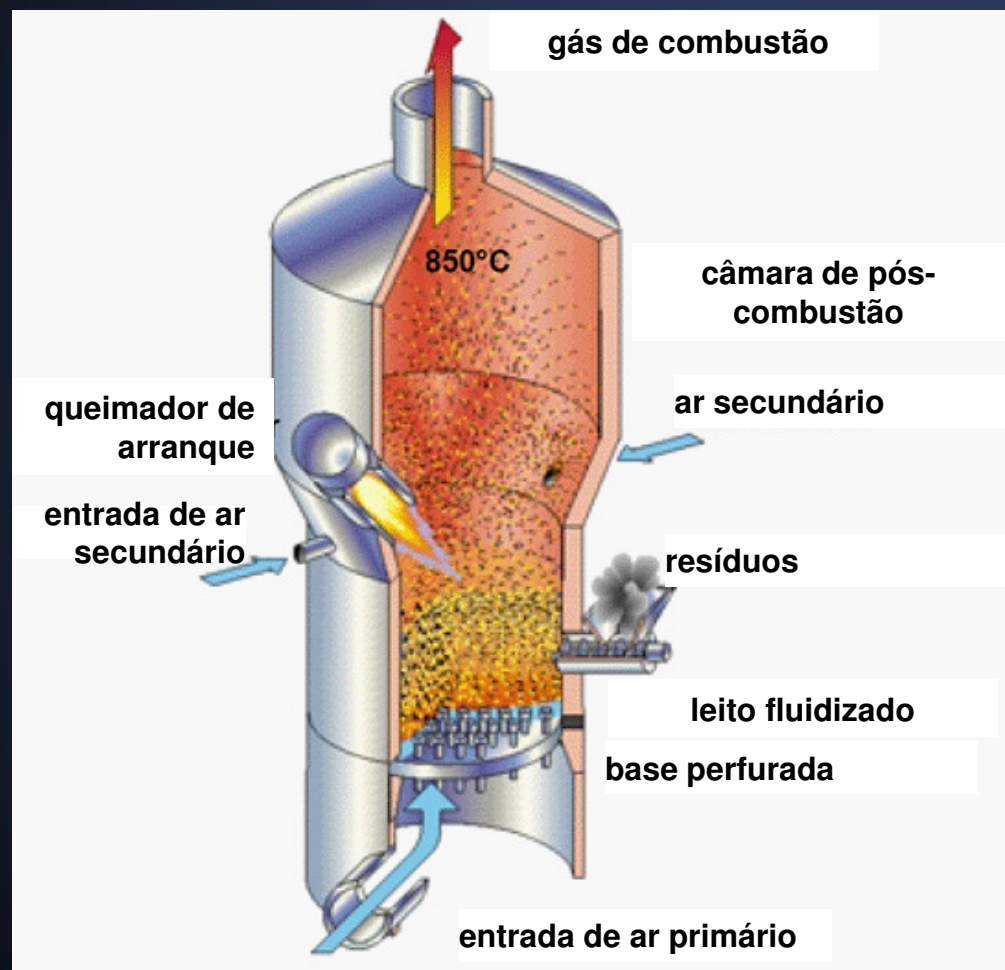


Um tratamento mecânico típico para a produção de CDR (combustível derivado de resíduos)



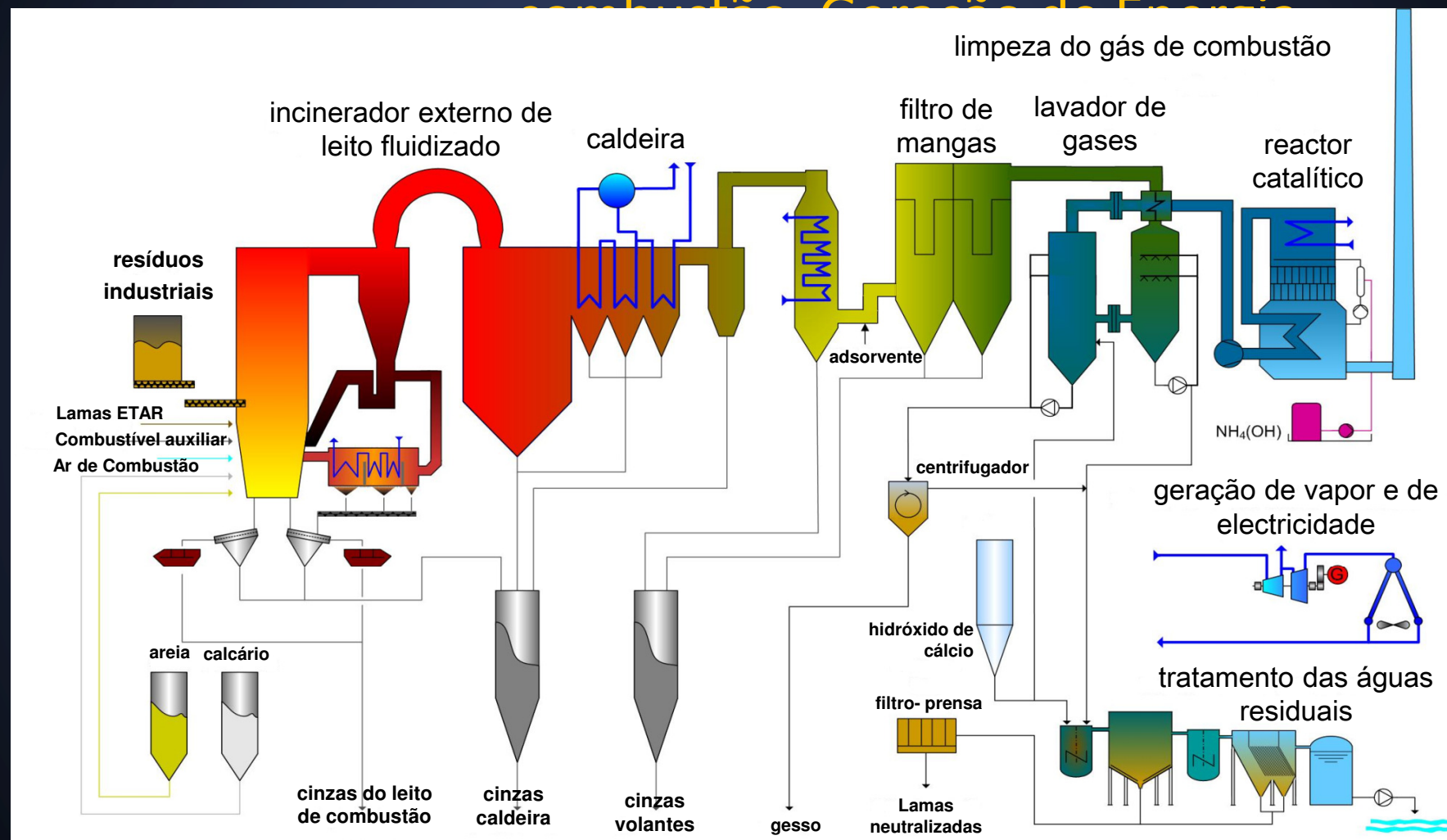
Exemplo de um Sistema de incineração grelha





- **Tratamento Térmico de Resíduos controlado e completo, de acordo com o Estado da Arte**
- **Controlo dos “3 T”:**
 - Turbulência: > 3 Vol.-% O₂
 - Temperatura: > 850 °C
 - Tempo: > 2 segundos
- **A melhor tecnologia para incineração de lamas é resíduos pretratadas**

Design da Central de Leito Fluidizado: Caldeira, Limpeza do gás de



Type of waste fraction	Incineration in % weight	Comments
Paper, cardboard	approx. 5 - 15	Sorting and processing
Packaging plastics and composite materials	approx. 30 - 70	Content of „Plastic Packaging Bag“ and „Oekobox“
Packaging glass, Laminated glass	approx. 2 - 10	Plastics, composite films
Construction waste	approx. 10 - 40	Wood, shavings, packaging, Plastic pipes, foils, carpetings
Biological waste	approx. 5 - 10	Plastics, non-biodegradable materials
Bulky waste, scrap tires	approx. 70 - 90	without metals and recyclable fractions
Non-recyclable municipal waste fractions	approx. 50 - 95	without metals, due to biological processes (MBT)

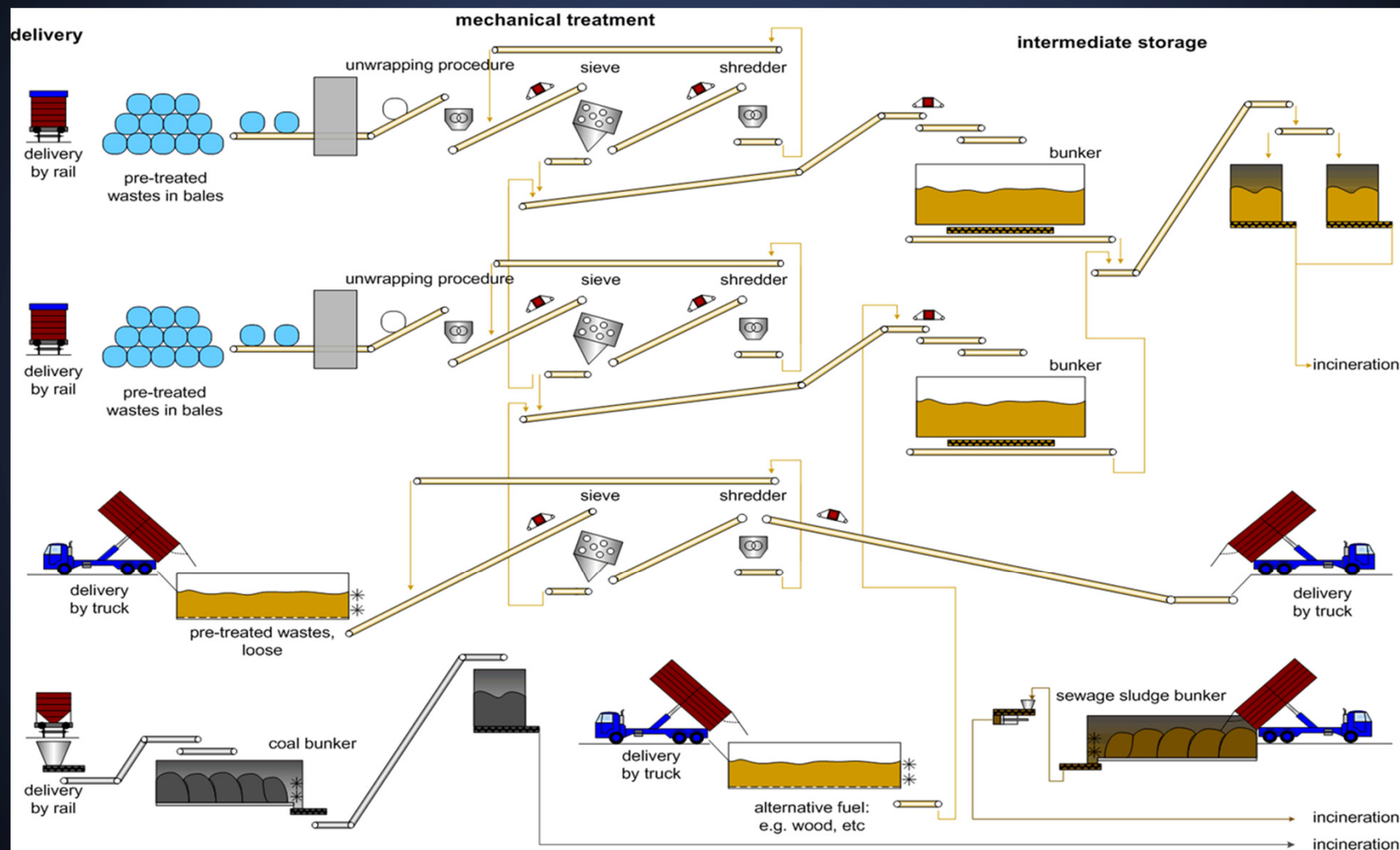
Exigências sobre a qualidade do RDF e os gatefees esperados para várias instalações de reciclagem

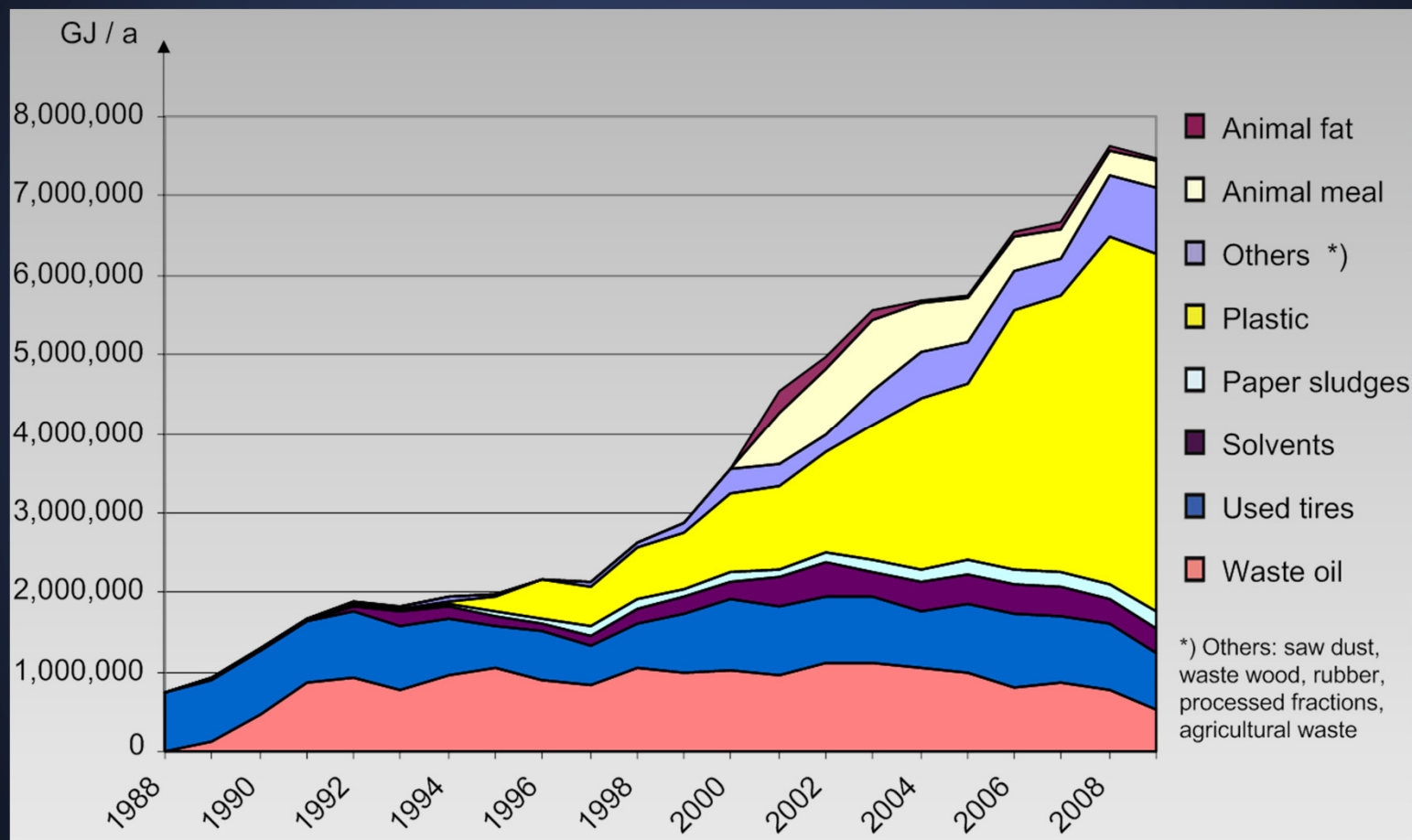
Type of Plant for Waste Incineration	Important technical requests on quality of fuel	Planned and unplanned stops per year	Price levels recently and from 2011 on in €/Mg	Remarks on mechanical pretreatment
Grate System with BAT- Standard	Particle size < 1 m Hv app. 8 - 12 MJ/kg (max. app. 14 MJ/kg)	app. 1x1 + + 1x3 weeks	app. 130 / 110 (related to app. 10 MJ/kg)	Treatment of bulky waste
Fluidized Bed System with BAT -Standard	< app. 100 mm (evtl. < 40 until < 250) app. 8 - 20 MJ/kg (unlimited)	app. 1x1 + + 1x3 weeks	app. 130 / 85 (related to app. 14 MJ/kg)	Mechanical pretreatment, separation of metals
Fluidized Bed acc. Standard for Biomass firing (dry gas-sorption und baghouse filter, eventually SNCR)	< app. 80 mm (evtl. < 40 until < 250) app. 12 - 16 MJ/kg orientating value: Cl < 0,1 %, S < 0,2 %, Hg < 0,5 ppm sum of metals < 0,5%	app. 1x1 + 1x3 weeks	app. 20 / 0 (related to app. 14 MJ/kg)	Separation of contaminated, treated wood, construction waste, etc.
Certified quality RDF for Cement Kiln	< ca. 60 mm (evtl. < 15 until < 200) app. > 18 MJ/kg (evtl. > 14 until > 22) orientating value: Cl < 0,3% (evtl. < 0,7) Hg < 0,5 ppm, further limits for Cd, Cr, other metals, and P, Na, K	app. 1x1 + + 1x5 up to 12 weeks	app. 50 / -15 (related to app. 25 MJ/kg)	Separation of low calorific and wet waste, inerts, metals (except aluminum foils), wind shifting, separation of PVC, downsizing



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O tratamento típico de CDR antes de um incinerador





State-of -the- Art Armazenamento Temporário de Resíduos em fardos de plástico envolto



Valorsul Valorizacao e Tratamento de Residuos Solidos das Regioes de Lisboa e do Oeste, S.A.



Start up:	2005
Site:	Amadora (area Lisbon)
Technology:	humid way, thermophilic digestion
Capacity:	40.000 Mg per y
Energy utilisation:	2 gas engines 1,7 MW
Waste:	separately collected organic waste

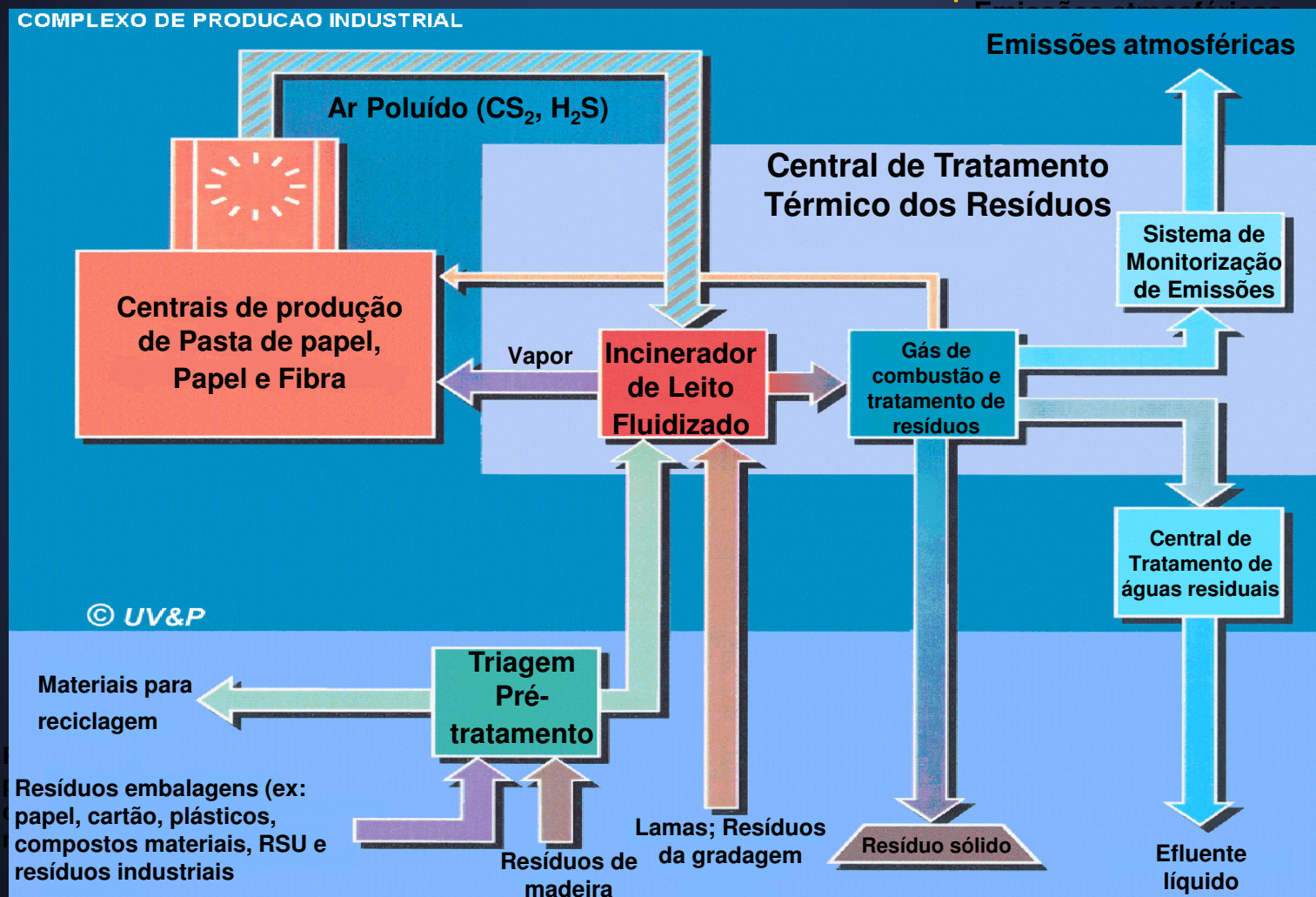
Exemplo para incineração de resíduos Municipal em Viena



Start up:	1971/1989/2013+1
4	
Site:	Spittelau Vienna
Technology:	Grate firing
Fuel capacity:	85 MW
Efficiency:	up to 90 percent (co-generation)
Steam production:	2 x 50 t / h (32 bar, 240°C)
Average waste throughput:	250,000 tons/p year
Fuel:	municipal waste

Conceito de Indústria de valorização energética de resíduos (UV&P, 1993)

RVL: Capacidade térmica 110 MW, para aprox. 300.000 tons de resíduos por ano

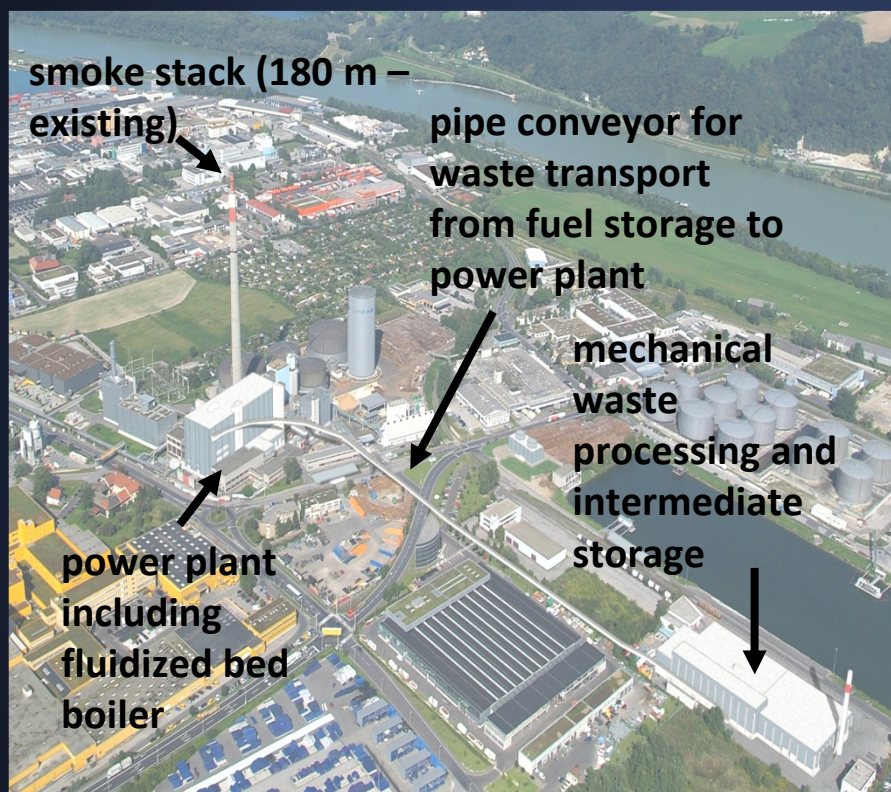


Exemplo para incineração de resíduos em contexto industrial



Planning (UV&P):	1993/94
Start Up:	1998
Technology:	Fluidized bed
Fuel capacity:	110 MW
Efficiency:	ca. 80 percent% (co-generation)
Steam production:	120 tph (80 bar, 500°C)
Electrical production:	ca. 16 MW
Average waste throughput:	up to 1.000 t per d
Fuels:	packaging waste, refuse- sewage sludge
Investment:	70 Mio. Euro (1996-98)

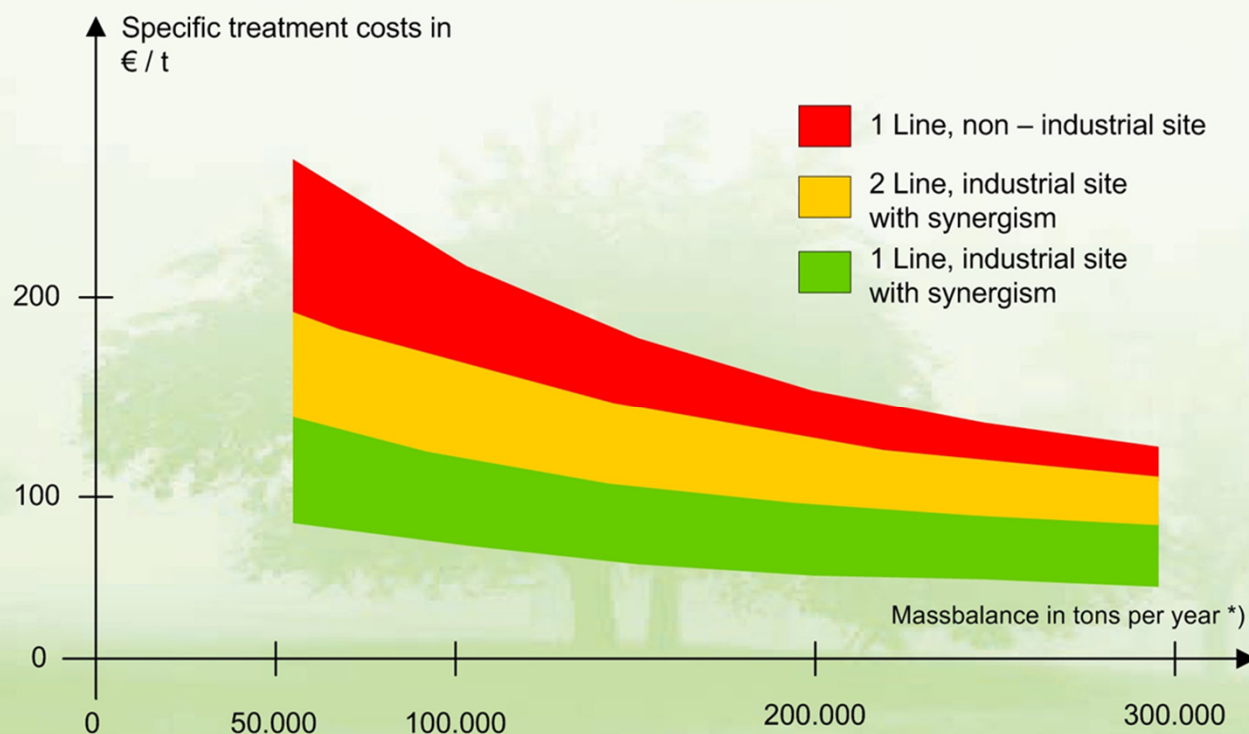
Exemplo para incineração de resíduos no município de Linz



Planning (UV&P):	2005 - 2007
Start Up:	2012
Technology:	Bubbling Fluidized bed
Fuel capacity:	70 MW
Efficiency:	ca. 80 percent% (co-generation)
Steam production:	80 tph
Electrical production:	up to 12 MW
Average waste throughput:	220.000 Mg per y
Fuels:	RDF, sewage sludge
Investment:	140 Mio. Euro (2009-2011)



Specific treatment costs as a function of size and location



*) based on average calorific value of approx. 10 MJ / kg and annual operation of 8.000 h

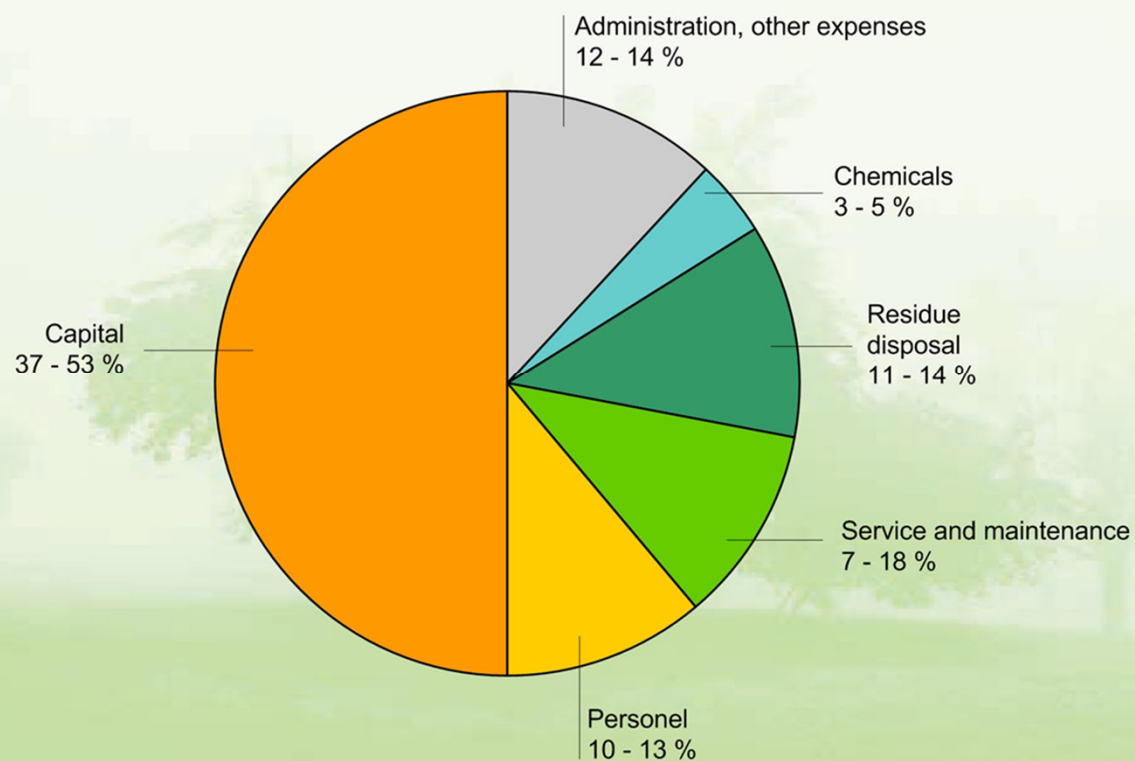
Source: UV&P 1992



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Composição dos custos específicos para incineração

**Composition of specific costs for incineration
of municipal solid waste**



Source: UV&P, Model calculation 2008



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Obrigado pela atenção!