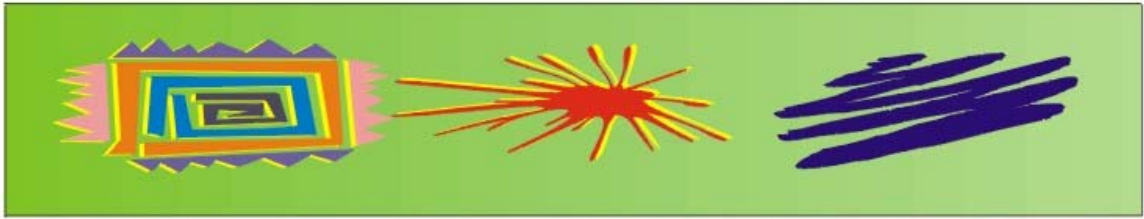


AEVERSU



Asociación Empresarial Valorización R.S.U.

CEWEP Congress

Amsterdam

7 - 8 of September 2004

Country Report: Spain

AEVERSU



Asociación Empresarial Valorización R.S.U.

SPAIN

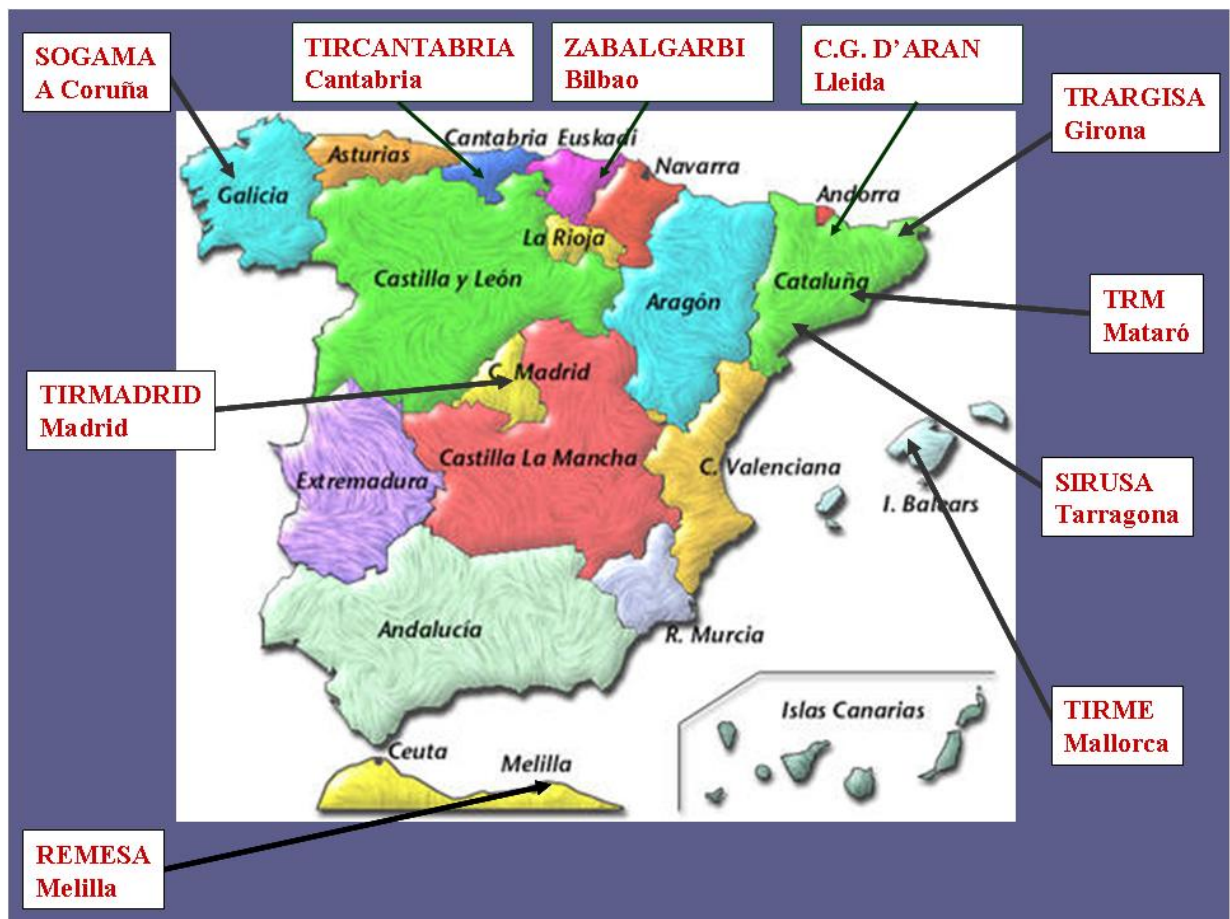
A. About AEVERSU

AEVERSU is an Association of WTE Plants in Spain, which represents the following facilities:

Facility	Nominal Waste Treatment Capacity (Tons/year)	Waste Treated in 2002 (tons)	Waste Treated in 2003 (tons)
TIRMADRID (Madrid)	240.000	296.525	296.650
SOGAMA (A Coruña)	550.000	245.353	500.000
REMESA (Melilla)	33.750	40.866	42.500
TRM (Mataró)	150.000	164.944	163.362
TRARGISA (Girona)	42.000	32.106	28.905
SIRUSA (Tarragona)	145.000	154.823	146.526
TIRME (Mallorca)	300.000	301.516	300.739
C.G. D'ARAN (Lleida)	3.750	4.370	u.a.
ZABALGARBI (Bilbao)	240.000	u.c.	u.c.
TIRCANTABRIA (Cantabria)	96.000	u.c.	u.c.

u.c.: Under construction; u.a.: under adaptation

These WTE-Plants, together with those not belonging to AEVERSU, are located all around the country, in the places indicated in the following map:



B. Amount of Waste

B. I. Total Amount of Urban Waste (in Tons):

2000	18.925.109
2001	19.124.750
2002	20.465.614

Source: Environmental Spanish Ministry

B. II. Total Amount of Industrial Waste (in Tons):

2000	64.553.051
2001	59.261.442

Source: INE (National Institute of Statistics)

B. III. Total Amount of Thermally Treated Waste (in Tons):

2000	1.061.361**
2001	1.080.038**
2002	1.240.503*
2003	1.478.682*

Source: * AEVERSU; ** Environmental Spanish Ministry

According to the forecasts of the “Urban Waste National Plan” (BOE num 28, 2nd of February of 2000), the amount of thermally treated waste in 2006 should suffer a 9% increase with respect to the percentage fixed for 2001. This increase has not been achieved yet.

B. IV. Urban Waste Recycling Quota

Category of Waste	Selective collection and sorting		Year
	Amount (Tons)	Quota (%)	
Household Waste	1.554.167	----	2002
Paper, Cardboard	576.071	52,0	2002
Glas	424.642	36,3	2002
Plastics (packaging included)	303.700	19,6	2002
Metals (Steel)	138.349	51,2	2002
Metals (Aluminium)	11.063	17,1	2002
Composites	29.592	22.9	2002

Source: Environmental Spanish Ministry.

B. V. Composting Quota

In year 2002, about 5.605.976 Tons of urban wastes (biodegradable fraction) were treated in composting facilities, from which 593.741 Tons of compost have been obtained.

C. Energy-from-waste

C.I. Energy production from municipal waste

	Electricity [MWh]
In WtE-Plants 2002	807.530
In WtE-Plants 2003	917.718

Source: AEVERSU

Electricity is also produced from the biogas extracted at 10 of the 195 controlled landfills existing in Spain. Total Installed Electric Power was ca. 16 Mw in 2002. This amount has been increased up to 44 Mw in 2003.

C. II. Exported Energy

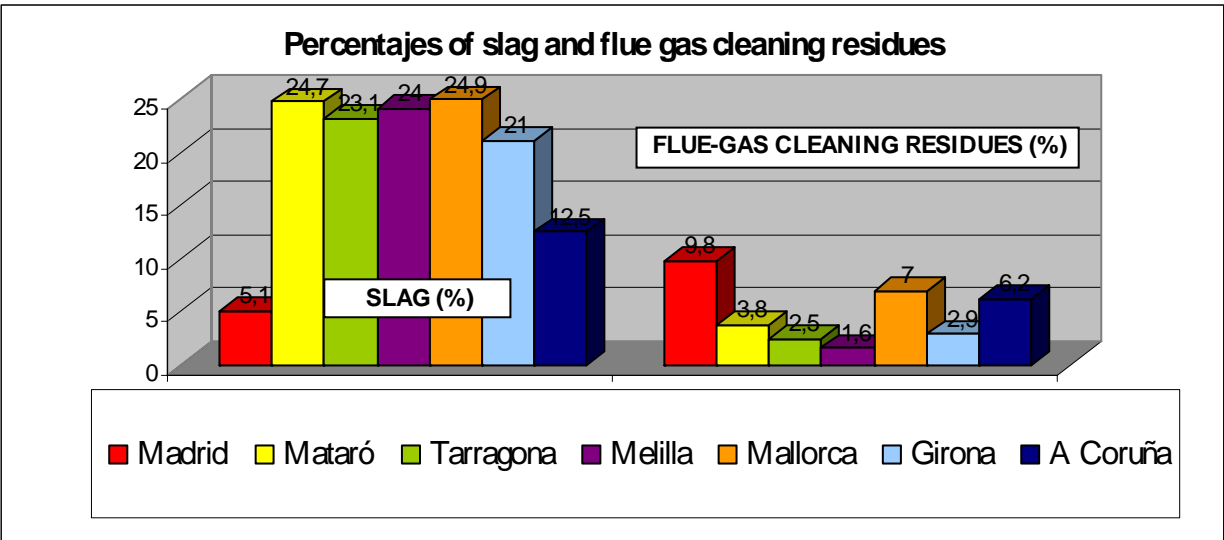
Most produced energy is exported to the electricity network

D. Technical aspects of WTE-Plants

- In almost all facilities - except for Madrid and A Coruña, which have fluidised bed technologies- roller grill-based furnaces are installed
- Waste treatment capacities vary between 2 and 30 t/h/line
- Total Installed Electric Power is ca. 194 Mw.
- Gas cleaning systems mainly consist on semi-dry absorbers for lime addition combined with bag-hose filters and additional injection of activated carbon. DeNOx systems are nowadays being installed in TIRCANTABRIA and ZABALGARBI and under project in other facilities.

E. By-products of the incineration process

- Except for Madrid and A Coruña (facilities with previous waste sorting), production of slag means between 21 and 25% in weight of the municipal waste (MW) incinerated
- As slag is recycled in most cases, incineration provides a 95% reduction in weight of the MW landfilled. The remaining 5% corresponds to flue-gas cleaning residues.



F. Economic aspects in WTE

F. I. Treatment prices in WTE-Plants (2003)

WTE Plant	Treatment Price (€/t)
TRARGISA (Girona)	59,00
TRM (Mataró)	39,92
SIRUSA (Tarragona)	34,00
REMESA (Melilla)	55,29
TIRMADRID (Madrid)	44,50
SOGAMA (A Coruña)	44,00
TIRME (Mallorca)	52,40

F.II. Electricity rates

The economic system for electricity sales is going to be regulated by the Royal Decree 436/2004, which gives two possibilities:

1. Regulated market (52,90 €/Mwh, estimation for 2004)
2. Free market (55,60 €/Mwh, estimation for 2004)

This Decree will enter in force in 2007. Until then, electricity rates for the existing facilities are calculated according to the Royal Decree 2818/1998. As an average, sale price for electricity in 2003, is calculated to be 55,1 €/Mwh).

G. Taxes & Bans

Taxes for **Landfills** are not generally implemented.

➤ Values for Madrid are:

10 €/ton Hazardous Waste

7 €/ton Domestic Waste

3 €/Ton Construction and demolition waste

- Average value in Catalonia: 10 €/Ton

H. Responsibilities

Responsibilities in waste management are regulated through Law 10/1998 (Waste Framework National Legislation).

Local authorities (municipalities): are responsible for the collection, transport and management (recovery and disposal) of urban waste, in the form in which it is established in the corresponding local decrees.

Government of the Autonomous Regions: are responsible for:

- The elaboration of Autonomous Master Plans for Waste Management. They include amount of produced waste and appropriate estimations of costs of the operations of prevention, valorization and disposal, as well as places and facilities for the disposal of waste.
- Authorization, monitoring, inspection and sanction of the activities of waste production and management.
- They will be competent to grant the authorizations of waste shipment from or towards countries of the European Union, according to European Regulations, as well as transfers in the Spanish territory. This includes inspection and derived sanctions.

National Government: is responsible for:

- The elaboration of National Master Plan on Wastes, through integration of Autonomous Plans
- The authorization of waste shipments from or towards third countries not operating in the European Union and the inspection derived from the mentioned regime of transfers.

I. Prices

I. Average net price per **incinerated** ton: ca. 47 €

II. Average net price per **landfilled** ton: Not available



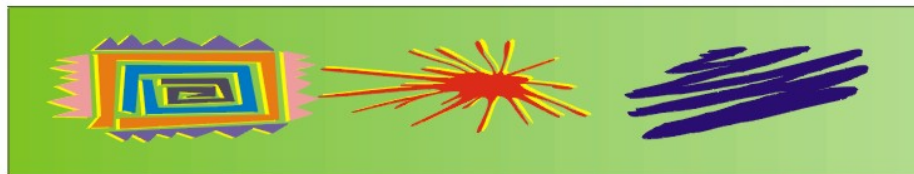
CEWEP Congress

Vienna

18th May 2006

Country Report: SPAIN

AEVERSU



Asociación Empresarial Valorización R.S.U.



About AEVERSU

AEVERSU is the Association of WTE Plants in Spain, which represents the following facilities:

Facility	Nominal Waste Treatment Capacity (Tons/year)	Waste Treated in 2004 (tons)	Waste Treated in 2005 (tons)
TIRMADRID (Madrid)	240.000	291.675	285.035
SOGAMA (A Coruña)	550.000	506.247	491.496
REMESA (Melilla)	31.000	46.227	46.618
TRM (Mataró)	160.000	149.218	155.608
TRARGISA (Girona)	35.000	30.620	28.200
SIRUSA (Tarragona)	150.000	137.205	137.180
TIRME (Mallorca)	300.000	328.749	280.703
TERSA (Sant Adrià)	310.000	328.832	336.418
ZABALGARBI (Bilbao)	240.000	u.c	u.c.
P. CANTABRIA (Cantabria)	96.000	u.c.	u.c.

u.c.: under construction/start-up



A. Amount of Waste

“Municipal Wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions” Waste List section 20.

	Year	In million tons
Total amount of Municipal Solid Waste (including household waste)	2004	22.735.142 ^a
Total amount of industrial/commercial waste		n.a.
Total amount of hazardous waste	2003	3.181.738 ^a
Total amount of waste		n.a.

Source: Environmental Spanish Ministry

n.a.: official data not available

B. Treatment of waste

	Year	Amount
Total amount of waste incinerated by Waste-to-Energy plants (in tons)	2005	1.761.258
Number of Waste-to-Energy Plants	2005	8 + 2 (u.c)
Number of planned Waste-to-Energy Plants	2009	1
Additional planned capacity (in tons)	2006	336.000
	2009	52.000
	2010 (TIRME)	300.000

Source: AEVERSU

	%	In tons	Year
Selective collection	8,95	2.036.048 ^a	2004
Composting	31,27	7.108.705 ^a	2004
Incineration	7,99	1.818.773 ^b	2004

a Source: Environmental Spanish Ministry; b Source: AEVERSU

C. Energy production

1. Total Electricity and Heat production in Waste-to-Energy plants

Reference year: 2005

Reference amount of thermally treated waste: 2005

	Electricity production in MWh/year	Heat production in MWh/year
a) in total	982.943	640.269
b) self demand:	160.000	531.398

2. Recognition as renewable

Recognition of waste as renewable y/n	Market price per MWh electricity*	Market price per kWh heat	Subsidy in €cent/kWh
n	53 €	--	--

* The economic system for electricity sales is going to be regulated by the Royal Decree 436/2004, which gives two possibilities:

Regulated market (52,90 €/Mwh, estimation for 2004)

Free market (55,60 €/Mwh, estimation for 2004)



This Decree will enter in force in 2007. Until then, electricity rates for the existing facilities are calculated according to the Royal Decree 2818/1998. As an average, market price for electricity in 2005, is calculated to be 53 €/Mwh.

D. Residues

1. Slag/bottom ash

Annual amount: 2005: 293.693Tn

Method of treatment (e.g. road construction, landfill): Road construction, landfill site

2. Filter Dust

Annual amount: 2005: 94.420Tn

Method of treatment (e.g. salt mine, hazardous landfill site): hazardous landfill site

E. Export and Import of MSW

1. Export: n.a

2. Import: n.a

Reference year:

F. Responsibilities public - private

Type of waste:	Responsibility for treatment: Public/Private	Responsibility for collection and transport: Public/Private	Municipalities' responsibility for monitoring: Yes/No
from private households	Public	Public	Yes
commercial waste similar to household waste	Public	Public	Yes
industrial/commercial waste	Private	Private	NO
hazardous waste	/Private	Private	NO

G. Solid Recovered Fuels

1. Amount of Solid Recovered Fuels (SRF)/year

solid recovered fuels - solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants, and meeting the classification and specification requirements laid down in CEN/TS WI00343003.

- a) **Current Production:** n.a.
- b) **Potential:** n.a.

2. Experience:

H. Prices and taxes

1. The net price per **incinerated** ton of MSW in WtE Plants (**min, max** and **average** price): min: 34 euros; max: 90 euros; average: 45 euros
 VAT: 7%
 Incineration tax: no
2. Average net price per **landfilled** ton of MSW (**min, max** and **average** price):
 VAT: 7%
 Landfill tax: Average value in Catalonia: 40 €
 Madrid: 25,36 €

I. Economy

1. **The average investment cost per ton of annual capacity (for a new plant, considering 15-20 years operation):** 3.470.665 €/Tn/hour
2. **Investment cost regarding flue gas cleaning system (% of total investment):**
 15%



J. Employment

1. **The amount of employment created by the Waste-to-Energy industry**
 - a) Direct jobs e.g. in WtE plant (reference to total capacity): 400 (aprox)
 - b) Indirect jobs in the economy.(reference to total capacity): n.a.

CEWEP Congress

Bordeaux

12th June 2008

Country Report:

Spain

AEVERSU

A. Amount of Waste

“Municipal Waste” means waste from households as well as commercial, industrial and institutional waste, which because of its nature and composition is similar to waste from households (excluding hazardous waste).

In your country	Year	In million tonnes
Total amount of Municipal Solid Waste (MSW)		
MSW production / inhabitant / year: ____ kg/inh		
Total amount of household waste	2004	22.735.142 ^a
Total amount of commercial waste similar to household waste		
Total amount of industrial/commercial waste		n.a.
Total amount of hazardous waste	2003	3.181.738 ^a
Total amount of waste		n.a.

a: Source: Spanish Environmental Ministry

n.a.: official data non available

B. Treatment of waste

In your <u>country</u>	Year	In million tonnes
Total amount of thermally treated waste	2007	2.126.733
Total amount of waste incinerated by Waste-to-Energy plants:	2007	2.126.733
Number of Waste-to-Energy Plants	2007	10
Number of planned Waste-to-Energy Plants		-
Additional planned capacity	2010	360.000

In your <u>organisation/company</u>	Year	In million tonnes
Total amount of waste incinerated by Waste-to-Energy plants	2007	2.126.733
Number of Waste-to-Energy Plants	2007	10

In your country MSW	%	In million tonnes	Year
Recycling			
Composting	31,27	7.108.705 ^a	2004
Incineration	7,99	1.818.773 ^b	2004

b: Source AEVERSU

C. Energy production

1. Total Electricity and Heat production in Waste-to-Energy plants

Reference year: 2007

Reference amount of thermally treated waste in million tonnes:

Amount of Waste-to-Energy plants: 10

	Mio. MWh/ year
Electricity produced	1.606.191
Electricity exported	
Heat* produced	
Heat* exported	

* incl. heating, cooling and steam

2. Recognition as renewable

Recognition of waste as renewable y/n	Market price per kWh electricity in €cent/kWh	Market price per kWh heat in €cent/kWh	Price incl. subsidy or market based instruments (e.g. certificates) in €cent/kWh
How much %?	5,36		

D. Residues

1. Slag/bottom ash

Annual amount: 358.419 t (2007)

Method of treatment (e.g. road construction, landfill): Road construction, landfill site

2. APC (Air Pollution Control) Residues, incl. filter dust and boiler ash

Annual amount 94.420 t (2005)

Method of treatment (e.g. salt mine, hazardous landfill site): hazardous landfill site

E. Export and Import of MSW

1. **Export:**

2. **Import:**

Reference year:

F. Responsibilities public - private

Type of waste:	Responsibility for <u>treatment</u>: Public/Private	Responsibility for <u>collection and transport</u>: Public/Private	Municipalities' responsibility for <u>monitoring</u>: Yes/No
from private households	Public	Public	Yes
commercial waste similar to household waste	Public	Public	Yes
industrial/commercial waste	Private	Private	No
hazardous waste	Private	Private	No

G. Solid Recovered Fuels

1. Amount of Solid Recovered Fuels (SRF)/year

solid recovered fuels - solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants, and meeting the classification and specification requirements laid down in CEN/TS WI00343003.

- a) **Current Production: n.a.**
- b) **Potential: n.a.**

2. Experience (market development etc.):

3. Capacity for mechanical-biological treatment/ year

Currently:

Planned:

H. Prices and taxes

1. Waste-to-Energy prices 2007 for Municipal Solid Waste (MSW)

Average Net fee in €/tonne	VAT rate Value Added Tax %	Incineration/Energy tax in €/tonne	Total price €/tonne MSW
45	7	Min: 34€ Max: 90€	

Tax on co-incineration of waste:

2. Landfill taxes and bans

Average Net fee in €/tonne	VAT rate Value Added Tax %	Landfill <u>tax</u> / planned in €/tonne	Total price €/tonne MSW	Landfill <u>ban</u> / Planned
Catalonia: 40€ Madrid: 25.36€	7			

I. Economy

1. **The average investment cost per tonne of annual capacity (for a new plant, considering 15-20 years operation):** 3.470.665€/t/hour
2. **The average investment cost per MW heat and electricity respectively:**
3. **Investment cost regarding flue gas cleaning system (% of total investment):**
15%

J. Employment

The amount of employment created by the Waste-to-Energy industry

- a) Direct jobs in WtE plants (reference to total capacity): 400 approx.
- b) Indirect jobs in the economy (reference to total capacity): n.a.

CEWEP

Country Report

2010-2011

Spain



Data provided by AEVERSU

"Municipal Solid Waste" (MSW) means waste from households as well as commercial, industrial and institutional waste, which because of its nature and composition is similar to waste from households (excluding hazardous waste).

"Solid Recovered Fuels" (SRF) - solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants, and meeting the classification and specification requirements laid down in CEN/TS W100343003.

"Refuse Derived Fuels" (RDF) – please see above the definition of SRF. In the Country Report only RDF expression is used and it comprises SRF as well.

A. Amount of Waste

In the <u>country</u>	Year	In million tonnes
Total amount of Municipal Solid Waste (MSW): MSW production / inhabitant / year: 538 kg/inh	2009	25.295
Total amount of household waste	2009	19.860
Total amount of commercial waste similar to household waste	2009	5.454
Total amount of industrial/commercial waste	2009	40.157
Total amount of hazardous waste	2009	2.306
Total amount of waste	2009	70.999

B. Treatment of Waste

In the <u>country</u> (concerning MSW)	%	Year	In million tonnes
Recycling (including composting)	38.77	2009	12.165
Composting			
Incineration	7.01	2009	2.200
Landfilling	54.22	2009	17.012

In the <u>country</u>		Year	In million tonnes
Total amount of thermally treated waste:			
Total amount of waste incinerated by:	Waste-to-Energy plants:	2010	1.704
		2011	2.041
	RDF plants:	2010	0.434
		2011	0.422

In the <u>country</u>		Year	Number of plants
Number of:	Waste-to-Energy plants:	2010	8
		2011	8
	RDF plants:	2010	2
		2011	2

In the <u>organisation/company</u>		Year	In million tonnes
Total amount of waste incinerated by:	Waste-to-Energy plants:	2010	1.742
		2011	2.076
	RDF plants:	2010	0.434
		2011	0.422

In the <u>organisation/company</u>		Year	Number of plants
Number of:	Waste-to-Energy Plants:	2010	9 ^a
		2011	9
	RDF plants:	2010	2
		2011	2

Capacity development in the <u>country</u>	Years					
	2010 – 2012		2013 – 2016		2017 – 2020	
	Additional Capacity, ktonnes	Additional number of plants	Additional Capacity, ktonnes	Additional number of plants	Additional Capacity, ktonnes	Additional number of plants
Planned Waste-to-Energy plants:	460					
Planned RDF plants:						
Total:						

C. Energy production in Waste-to-Energy and RDF plants

1. Total Electricity and Heat production in Waste-to-Energy and RDF plants

Reference year: 2010

Total Electricity & Heat production	Waste-to-Energy plants		RDF plants	
	In the <u>country</u>	In the <u>organisation/ company</u>	In the <u>country</u>	In the <u>organisation/ Company</u>
Reference amount of thermally treated waste in million tonnes:	2010: 1.704	2010: 1.742	2010: 0.434	2010: 0.434
	2011: 2.041	2011: 2.076	2011: 0.422	2011: 0.422
Number of plants:	8	9	2	2
Electricity produced in million MWh/ year	2010: 1.444	2010: 1.461	2010: 0.322	2010: 0.322
	2011: 1.672	2011: 1.689	2011: 0.296	2011: 0.296
Electricity exported in million MWh/ year	2010: 1.322	2010: 1.335	2010: 0.171	2010: 0.171
	2011: 1.519	2011: 1.532	2011: 0.153	2011: 0.153
Heat* produced in million MWh/ year	2010: 0.106	2010: 0.106		
	2011: 0.130	2011: 0.130		
Heat* exported in million MWh/ year	2010: 0.085	2010: 0.085		
	2011: 0.087	2011: 0.087		

* incl. heating, cooling and steam

^a Data include plant in Andorra.

2. Recognition of energy produced in Waste-to-Energy and RDF plants as renewable

Recognition of MSW as renewable:

How much %?

<u>In the country</u>	<u>Electricity</u>	<u>Heat</u>
Market price per kWh in €cent/kWh	2010: 3.795 €/MW 2011: 5.09 €/MW	
Subsidy or market based instruments		
Price incl. subsidy or market based instruments in €cent/kWh		

D. Residues

Reference year: 2010

<u>Slag/bottom ash</u>	<u>In the country</u>	<u>In the organisation/company</u>
Annual amount in million tonnes:	2010: 0.349 2011: 0.415	2010: 0.356 2011: 0.422
Method of utilisation or disposal (%): (road construction, cement production, construction block fabrication, landfill)		Landfill use (ridge, regularization, etc), road construction, cement production
Recovery of metals:	2010: 0.0640 2011: 0.0708	2010: 0.0647 2011: 0.0714
• Annual amount (tonnes):		
• Ferrous (F) material extracted (gross weight, tonnes):	2010: 0.0338 2011: 0.041	2010: 0.0345 2011: 0.0421
• Non Ferrous (NF) material extracted (gross weight, tonnes):		
• Typical composition of the NF fraction (% Al, other NF, inert):	2010: 0.0009 2011: 0.0011	2010: 0.0009 2011: 0.0011

<u>APC (Air Pollution Control) residues</u> (incl. filter dust and boiler ash)	<u>In the country</u>	<u>In the organisation/company</u>
Annual amount in million tonnes:	2010: 0.126 2011: 0.157	2010: 0.128 2011: 0.158
Method of treatment or disposal (e.g. stabilisation, salt mine, hazardous landfill site):		Stabilisation, disposal landfill, hazardous landfill site and authorized agent

F. Responsibilities Public - Private

Type of waste:	Responsibility for <u>treatment</u> :	Responsibility for <u>collection and transport</u> :	Municipalities' responsibility for <u>monitoring</u> :
from private households	Public	Public	Yes
commercial waste similar to household waste	Public	Public	Yes
industrial/commercial waste	Private	Private/public	No/Yes
hazardous waste	Private	Private/public	No/Yes

G. Refuse Derived Fuels (RDF)

In the country, reference year:

1. **Amount** of RDF/year
 - a. **Current Production:**
 - b. **Potential:**
2. **Experience** (market development etc.):
3. **Capacity** for mechanical-biological treatment/ year

Currently:

Planned:

H. Prices and taxes

1. **Waste-to-Energy prices** for Municipal Solid Waste (MSW)

Reference year:

Average Net fee in €/tonne	VAT (Value Added Tax) rate %	Incineration/Energy tax in €/tonne	Total price €/tonne MSW
	2010: 7% 2011: 8%		16-131

Is there a tax on co-incineration of waste?

2. **Landfill taxes and bans**

Reference year:

Average Net fee for landfilling in €/tonne	VAT (Value Added Tax) rate %	Landfill <u>tax</u> in €/tonne	Total price for landfilling in €/tonne MSW	Landfill <u>ban</u>

I. Economy

1. **The average investment cost per tonne of annual capacity (for a new plant, considering 15-20 years operation): 585 €/t**
2. **Investment cost regarding flue gas cleaning system (% of total investment): 16%**
3. **The average investment cost per MW heat and electricity installed respectively: 7.4 million €**

J. Employment

The amount of employment created by the Waste-to-Energy industry

Jobs in WtE plants including operation process, administration and outsourced personnel hired on regular basis i.e. during maintenance (reference to total capacity): 855 direct jobs, 926 outsourced personnel.