

## Green-field Waste-to-Energy Facilities and New Units Selected References

Client/ location	Country	Project	Capacity tpa	Ramboll's main responsibilities	Year
MV Kiel	Germany	New WtE unit (CHP)	100,000	Project planning, conceptual and detailed design, permits, management of the procurement process, preparation of tender documents, bid evaluation and contract negotiations. Civil engineering design	2006-2010
Regions of Durham and York / MacViro Consultants	Canada	Green-field WtE facility	250,000-400,000	Integration of architectural and technical design; overall development of the facility; and input during the procurement of the facility (pre-qualification and tender documents)	2006-2007
States of Alderney	Alderney	New waste treatment facility	500 kg/h	Updating of tender documents, tendering, evaluation of tenders, contract negotiations	2006
Tynes Bay Waste Treatment Facility	Bermuda	New WtE unit and upgrading of existing two units	Up to 100,000	Feasibility study and preparation of tender documents	2006-2007
Norsk Varme/ Kristiansand	Norway	Green-field WtE facility (CHP)	80,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2005-2009
SYSAV*	Sweden	New WtE unit (CHP)	210,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2005-2008
European Bank for Reconstruction and Development	Russia	Green-field fluidised bed sludge incineration facility in St. Petersburg	3 x 16,000	Lender's Supervisor	2005-2007
Uddevalla Energi*	Sweden	Green-field WtE facility (CHP)	88,000	Planning, conceptual design, tendering, contracting	2005-2006
South East Region*	Ireland	Procurement of an integrated waste management system including WtE (25 years DBFO contract)	up to 300,000	Waste strategy review, PPP assessment, project structuring, tendering, contracting, project/contract management, supervision, and commissioning	2004-2009
European Commission	Russia	Green-field fluidised bed sludge incineration facility in St. Petersburg	2 x 52,000	Bid evaluation, contract management, supervision, commissioning and project management	2004-2007
Trekantområdets Affalds-selskab I/S*	Denmark	New WtE unit (CHP)	80,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	2003-2007
Trondheim Energiverk*	Norway	New WtE unit (CHP)	120,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2003-2006

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States of Alderney	UK	Establishment of a waste gasification system	2,000	Procurement of a waste gasification system on a lease basis	2002-2004
I/S FASAN*	Denmark	Establishment and operation of a green-field WtE facility	65,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	2001-2005
States of Guernsey, Board of administration	UK	Establishment and operation of a green-field WtE facility (DBO contract)	72,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2001-2005
EPA Hong Kong	Hong Kong	Animal carcass incineration facility	30 tpd	Feasibility study and preparation of tender documents	2001
Vattenfall Värme Uppsala AB*	Sweden	New WtE unit (CHP)	175,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2000-2004
DANIDA / Cairo University Hospital	Egypt	Introduction of a new clinical waste system. Establishment of a state-of-the art clinical waste incineration facility	Batch 2 x 3.6 tpd	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2000 – 2002
I/S Reno-Nord*	Denmark	New WtE unit (CHP)	160,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1999-2006
Halmstad Renhållnings AB*	Sweden	New WtE unit (CHP)	120,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	1999 – 2003
SYSAV*	Sweden	New WtE unit (CHP)	210,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1998 – 2003
Department of Local Government and Environment, Isle of Man	UK	Establishment and operation of a green-field WtE facility, including a facility to incinerate special waste (20 year DBO contract).	65,000 + 5,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning, project follow-up during 25-year operation contract	1997 – 2025
I/S REFA*	Denmark	New WtE unit (CHP)	72,000	Planning, environmental approval, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1997 – 2000
BIR*	Norway	New WtE unit (CHP)	112,000	Planning, conceptual design, tendering, contracting of the electro-mechanical equipment	1996

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Client/ location	Country	Project	Capacity tpa	Ramboll's main responsibilities	Year
Avedøre Wastewater Treatment Plant (serves a large part of Copenhagen)	Denmark	New sludge incineration facility based on fluidised bed technology	16,000 (on dry basis)	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning. Civil engineering design	1995 – 2001
I/S Nordforbræn- ding*	Denmark	New WtE unit (CHP)	80,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1994- 2000
I/S KARA*	Denmark	New WtE unit (CHP)	160,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1994- 2000
Svendborg Incineration Plant I/S*	Denmark	New WtE unit (CHP)	48,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1994- 1999
I/S Vestforbræn- ding*	Denmark	New WtE unit (CHP)	210,000	Planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1994- 1999
AVV I/S*	Denmark	New WtE unit (CHP)	50,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	1993- 2000
Environmental Protection Agency	Taiwan	Establishment and operation of a green-field WtE facility	300,000	Expert support to tender preparation, bid evaluation, evaluation of specifications, supervision and commissioning	1993- 1999
Sønderborg CHP plant*	Denmark	New WtE unit (CHP)	66,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning. Civil engineering design	1993 – 1996
LIPOR (Oporto)	Portugal	Establishment and operation of a green-field WtE facility	400,000	Expert assistance in the tender evaluation	1993

### Notes

\*a regional local authority waste disposal company

## Upgrading/Retrofit of Waste-to-Energy Facilities Selected References

Client/ location	Country	Project	Capacity tpa	Ramboll's main responsibilities	Year
Klemetsrud Avfallsenergi verk*	Norway	Upgrading of two existing units	2 x 80,000	Plant inspection and proposal for upgrading	2006
Tynes Bay Waste Treatment Facility	Bermuda	Upgrading of two existing units and establishment of new WtE unit	2 x 48,000	Plant inspection and proposal for upgrading	2006
Halmstad Renhållnings AB*	Sweden	Upgrading of existing WtE facility, including ECO and convection part	2 x 40,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2005
Halmstad Renhållnings AB*	Sweden	Upgrading of existing WtE facility, including refractory lining, gas/gas reheater, make-up water, electrical installations	120,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2005
ASM Brescia	Italy	Upgrading of existing WtE facility, including crane automation and establishment of a new crane	3 x 184,000	Feasibility study, planning, conceptual design, tendering, contracting	2004- 2006
I/S Reno- Nord*	Denmark	Upgrading of existing WtE facility, including crane automation	160,000 + 88,000	Feasibility study, planning, conceptual design, tendering, contracting	2004- 2006
Trondheim Energiverk*	Norway	Upgrading of existing WtE facility, including SNCR and wastewater treatment	2 x 48,000	Feasibility study, planning, conceptual design, tendering, contracting	2004 – 2006
IRF, Leirvik*	Faroe Islands	Upgrading of existing WtE facility, including flue gas treatment system and furnace/boiler	20,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2004 – 2006
Torshavn Municipality	Faroe Islands	Upgrading of existing WtE facility, including flue gas treatment system and grate	20,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2004 – 2005
TIRME, S.A., Mallorca	Spain	Upgrading of existing WtE facility, including flue gas treatment system and SCR	2 x 150,000	Assistance in evaluation of tenders for the establishment of a system for selective catalytic reduction of NO <sub>x</sub> (SCR)	2004- 2005
Århus Kommunale Værker	Denmark	Upgrading of existing WtE facility, including flue gas treatment system, SNCR and burners	2 x 64,000	Feasibility study, planning, conceptual design, tendering, contracting	2003 – 2006
I/S KARA*	Denmark	Upgrading of existing WtE facility, including establishment of SNCR	160,000 + 2 x 56,000	Feasibility study, planning, conceptual design, tendering, contracting	2003- 2005
AVV I/S*	Denmark	Upgrading of existing WtE facility, including flue gas treatment system	48,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2003- 2005

## Upgrading/Retrofit of Waste-to-Energy Facilities Selected References

Client/ location	Country	Project	Capacity tpa	Ramboll's main responsibilities	Year
Lynette-fællesskabet I/S	Denmark	Upgrading of sludge incineration facility, including flue gas treatment system	-	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2003 – 2005
SYSAV*	Sweden	Upgrading of existing WtE facility, including flue gas treatment system and boilers	2 x 96,000	Feasibility study, planning, conceptual design, tendering, contracting	2003 – 2005
I/S KARA*	Denmark	Upgrading of existing WtE facility, including crane automation	160,000 + 2 x 56,000	Feasibility study, planning, conceptual design, tendering, contracting	2003-2004
I/S Amagerforbrænding*	Denmark	Upgrading of existing WtE facility, including crane automation	4 x 96,000	Feasibility study, planning, conceptual design, tendering, contracting	2003-2004
KAVO I/S*	Denmark	Upgrading of existing WtE facility, including flue gas treatment system and burners	32,000 + 48,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2002-2006
Sønderborg CHP plant*	Denmark	Upgrading of existing WtE facility, including flue gas treatment system	64,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2002-2004
I/S FASAN*	Denmark	Upgrading of existing WtE facility, including flue gas treatment system	2 x 36,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, commissioning	2001-2005
Halmstad Renhållnings AB*	Sweden	Upgrading of existing WtE facility, including flue gas treatment system	2 x 40,000	Feasibility study, planning, conceptual design, tendering, contracting	2001-2005
I/S Nordforbrænding*	Denmark	Upgrading of existing WtE facility, including establishment of SNCR	88,000 + 3 x 24,000	Analysis, planning, conceptual design, tendering, contracting, project/contract management, supervision, commissioning	2001-2005
City of Budapest	Hungary	Upgrading of existing WtE facility, including flue gas treatment system and furnace/boiler. Introduction of facilities for pre-treatment of waste and treatment and disposal of residues	4 x 120,000	Analysis, planning, conceptual design, tendering and contracting of the upgrading of the WtE facility and the new units for the pre-treatment of waste and management of residues	2001-2002
Kommune-kemi Ltd	Denmark	Complete retrofit of hazardous waste incineration facility	-	Supervisor of the retrofit of the combustion chamber and the boiler	2001

### Notes

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## Studies on Waste-to-Energy Facilities Selected References

Client/ location	Country	Project	Ramboll's main Responsibilities	Year
RVF	Sweden	Grate technology	Comparison of grate technologies	2006- 2007
Arctic Paper Håfreström	Sweden	Concept for fuel conversion	Pre-feasibility study	2006- 2007
Lincolnshire County Council	UK	Development and procurement of a Public Private Partnership for Lincolnshire Waste Treatment Project	Preparation of Outline Business Case for 5 EfW facilities	2006- 2007
AVR, Rotterdam	Netherlands	New 500,000 t/a WtE units to replace existing four units	Feasibility study	2006
SORPA	Iceland	New 25 t/h WtE facility	Feasibility study	2006
MVA Flingern, Düsseldorf	Germany	Strategic development of existing plant	Master plan	2006
Vilnius Energija/ Dalkia	Lithuania	New MSW and straw fired CHP plant in Vilnius	Pre-feasibility study	2006
Merseyside Waste Disposal Authority	UK	Review of waste strategy	Preparation of Outline Business Case for two MBT plants followed by two 170,000 t/y EfW plants	2005- 2007
Government of Gibraltar	Gibraltar	New WtE facility for the incineration of MSW and sludge and demolition of an existing WtE facility	Preparation of public sector comparator	2005- 2009
Norsk Varme	Norway	New WtE facility	Environmental Impact Assessment	2005- 2006
Energinet.dk	Denmark	Dioxin formation	Study of dioxin formation and destruction mechanisms in WtE facilities	2005- 2006
Denmark nationwide	Denmark	Valuation of WtE facilities	Preparation of report	2005
States of Alderney	Alderney	New incineration facility	Feasibility study	2005
I/S Amagerforbræ nding*	Denmark	New WtE unit(s)	Feasibility study	2005
Reno-Sam	Denmark	Waste incineration in Denmark	White Paper – Study of waste incineration in Denmark	2005
Eight waste management companies	Denmark	Merger	Feasibility study of merging waste management companies	2005
Rambøll/Vø- lund	Denmark	100 Years of Waste Incineration in Denmark	Preparation of historical review of waste incineration in Denmark	2004
I/S TAS*	Denmark	New WtE facility	Environmental Impact Assessment	2004

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Client/ location	Country	Project	Ramboll's main Responsibilities	Year
States of Guernsey	Guernsey	Emerging technologies	Study of emerging technologies	2004
EPA Hong Kong	Hong Kong	Household problematic waste	Study of household problematic waste	2003
I/S Reno-Nord*	Denmark	New WtE Facility	Environmental Impact Assessment	2002
NEFCO via ERM	Russia	Retrofit of waste incineration facility in Murmansk	Feasibility study	2002
EPA Hong Kong	Hong Kong	New animal carcass incinerator	Feasibility study	2001
States of Alderney	UK	Review of waste strategy	Review of Alderney's preliminary waste strategy including an analysis of an on-island disposal option of MSW through thermal treatment	2001
South East Region	Ireland	Preparation of Waste Management Plan for the region	As a sub-consultant to a local Irish Consultant Ramboll prepared the review and assessment of the thermal treatment options outlined in a previous strategy study	2000
Danish EPA	Denmark	Waste as a resource for energy production	Studies to assess the need for incineration over the next decade for each region and for Denmark as a whole	2000
Municipality of Torshavn	Faroe Islands	New WtE unit (CHP)	Feasibility study	2000
I/S FASAN*	Denmark	New WtE unit and purchase of a gas fired power plant	Technical, operational and financial analysis to assess the feasibility of a new facility and the purchase of a gas fired power plant	1999 - 2000
I/S Vestforbrænding*	Denmark	Retrofit and/or new WtE unit	Feasibility study	1999
Danish Energy Agency	Ukraine	New WtE facility or upgrade of existing facility in Kiev	Feasibility study	1999
World Bank (IBRD)	Regional	Preparation of the World Bank publication " <i>the Decision Makers Guide to Municipal Solid Waste Incineration</i> "	Preparation of the guide and a supporting World Bank Technical Paper " <i>Municipal Solid Waste Incineration – Requirements for a Successful Project</i> "	1998
I/S Vestforbrænding*	Denmark	Environmental Impact Assessment. Application for environmental permit	Preparation of EIA and application for environmental/operational permit for I/S Vestforbrænding – the largest WtE facility in Scandinavia	1998
Municipality of Køge	Denmark	Privatisation of sludge incineration facility	Support to the seller of the facility (the municipality) with analysis and during negotiations	1998
The European Bank / Moscow City	Russia	Review of PPP options for waste treatment in Moscow	Review of PPP options for the revamping, financing and operation of incineration plants in Moscow city	1997
I/S Fælles Forbrænding*	Denmark	New green-field WtE facility	Feasibility study	1996

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Oslo Renholdsver- ket*	Norway	New WtE unit	Feasibility study	1996
DANIDA	Philip-pines	Pre-appraisal of WtE facility	Review of project feasibility	1995- 1996
IPE-EGF	Portugal	Review of alternative thermal treatment technologies	Preparation and review of different thermal treatment technologies. Presentation of plant concepts, environmental performance, costs and manufactures	1994
DANIDA	China	Pre-appraisal of WtE facility in Guangzhou	Review of project to assess feasibility for soft credit financing	1994
Moscow City	Russia	Rehabilitation of an existing WtE facility	Detailed study of the feasibility of rehabilitating plant no. 3 in Moscow (4 x 84,000 tpa)	1993- 2001
Municipality of Skagen	Denmark	New CC plant for incineration of waste, biomass and natural gas	Feasibility study. Preparation of preliminary design	1993
I/S KARA*	Denmark	New WtE facility	Feasibility study	1993

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