

## BETTINA KAMUK

### Head of Department, Waste-to-Energy (WtE)

#### KEY QUALIFICATIONS

Bettina Kamuk has over 20 years of comprehensive experience in waste management, in particular energy recovery from waste.

Bettina has experience as project manager/project director for WTE projects in Denmark, Norway, Germany, Austria, Italy, USA, Canada, as well as extensive experience from East-European countries.

Most recently Bettina Kamuk has worked as project manager for establishment of a green-field WTE facility (70,000 tpa) in Norway and a green field (220,000 tpa single line) WtE facility in Denmark. As Project Manager Bettina has been responsible for environmental approvals, design specifications, tendering, contracting and project implementation.

Bettina has a thorough knowledge of waste regulation, including BREF and future tendencies within the waste management business worldwide.

Through her position in international waste association, including ISWA and Ramboll's involvement in CEWEP (Confederation of European Waste-to-Energy Plants), she has a comprehensive network within the waste management business World-wide and especially within Waste-to-Energy.



#### CAREER

- 2011- Head of Department, Ramboll Denmark A/S
- 2009-2011 Market Director, WtE, Ramboll Denmark A/S
- 2008-2009 Senior Project Director, Ramboll Denmark A/S
- 2006-2008 Project Director, Ramboll Denmark A/S
- 1995-2006 Project Manager, Ramboll Denmark A/S
- 1990-1995 Project Engineer, Chemcontrol A/S
- 1990-1990 Environmental Officer, Herlev Municipality, Denmark
- 1989-1990 Environmental Officer, Vejle Municipality, Denmark

#### EDUCATION

- 1986-1989 B. Sc. Chemical Engineering, Engineering Academy of Denmark

#### PUBLICATIONS

- How to get the Public's Acceptance when locating of WTE Facility. A case from Copenhagen, ISWA, Korea, 2011
- More Energy From Waste- Supplying District Heating from WTE Facilities, ISWA, Korea 2011
- Waste to Energy as a Renewable Resource, Athens 2011
- The New 2.000 TPD WTE Facility in the City of Copenhagen, Nawtec, Lancaster, 2011
- Consequences by Operating at Extreme Steam parameters, WTERT, Brno, 2010
- Life Cycle Analysis of Air Pollution Control Technologies, WTERT, New York, 2010

Overview of Evolving Financial and Offsets Mechanisms, ISWA/DAKOFA, Denmark 2009  
The European Perspective on WtE, Council of Councils June 2009, Metro Vancouver, Canada, 2009  
Is De-NOx by SCR to be the future in the US, NAWTEC 2009, Chantilly, Virginia, USA, 2009  
The European experience for NOx removal from WTE process gas: Selective Non-Catalytic Reduction (SNCR) or Selective Catalytic Reduction (SCR), WTERT 2008, New York, USA, 2008  
The Public Perception Challenge – The European Perspective, NAWTEC 2008 Philadelphia, Pennsylvania, USA, 2008  
Beyond Turbines: Alternative Uses of Energy from Waste-to-Energy Facilities, WASTECON 2007, Reno, Nevada, USA, 2007  
Building Public Support for WTE Operations, WASTECON 2007, Reno, Nevada, USA, 2007  
Public Acceptance of Waste Incineration, NAWTEC 2007, Miami, USA, 2007  
The economic relevance of incineration, Americana 2007, Canada., 2007  
New EU Regulations – how will it influence the hazardous waste business?, NFFA Conference, Bergen, Norway, 2006., 2006  
WtE – how to use the energy from waste, Nawtec, Tampa, Florida USA, 2006., 2006  
ISWA's Working Group for Hazardous Waste, ISWA's Annual Congress, Buenos Aires, Argentina, 2005., 2005  
Sins of the Past – Safe treatment of obsolete Pesticides in Romania , ISWA's Annual Congress, Buenos Aires, Argentina, 2005., 2005  
Waste-to-Energy. The Environmental Perspective in Europe , Nawtec, Orlando, Florida, 2005., 2005  
Experience from establishing a Management System for Hospital Waste in Cairo, Egypt, ISWA conference on Hospital Waste, Shanghai, China, June 2004. , 2004  
Operation and Management of Waste Incineration Plants, The Danish Magazine Maintenance, 2004. , 2004  
Stabilising Inorganic Waste from Flue Gas Treatment, ISWA's Annual Congress, Melbourne, Australian, November 2003. , 2003  
Tendencies in Waste "Stabilising Hazardous Waste from Flue Gas Treatment", ISWA's Beacon conference, Barcelona, Spain, November 2002. , 2002  
Management in Denmark and EU, Board Meeting, Leirvik, Faroe Islands, June 2001., 2001  
Collection Systems for Hazardous Waste from Households , Environmental Report 1990:12 of the Nordic Council., 1990

#### MEMBERSHIPS

ISWA-International Solid Waste Association (chairman at the working group, and member of the Scientific and Technological committee)  
DAKOFA (the Danish Waste Association) (chairman of the Waste And Climate Network)  
SWANA (Solid Waste Association og North America)  
Canadian Energy From Waste Coalition

**PROJECTS****WtE Study, Atlanta Airport, 2010, United States**

Study regarding establishing a WtE facility at Atlanta Airport treating airport waste and MSW.

2010-ongoing: Bettina is the Project Manager, and calculates the energy used at the airport and the local grid.

**Establishing of a new Landfill, Municipality of Thorshavn, 2007, Norway**

Ramboll is responsible for input to the environmental approval procedure and for the design specification of the landfill.

2007-ongoing: Bettina is the Project Manager for the establishment of a new landfill in the municipality of Torshavn.

**E.ON Värme Sverige AB - Högbytorp, E.ON Värme Sverige AB, 2011-2012, Sweden**

The project includes consulting services relating to the technical framework to form the basis of an application for an environmental permit.

2011-2012: Bettina is the Project Manager.

**Technical Review RDF, Ministry of Environment British Columbia, 2011-2011, Canada**

Ramboll has been engaged by the Ministry of Environment in British Columbia, Canada to perform a technical review of environmental practises for the combustion of refuse derived fuel (RDF). The project will access practices in other jurisdictions.

2011: Bettina is the Project Leader on behalf of Ramboll.

**Feasibility Study, Renosyd I/S, 2011-2011, Denmark**

2011: Bettina was responsible for the analysis of the CHP facility to create a basis for the Board to take decision on future retrofit and development of the CHP facility. Ramboll act as owners engineer.

**WtE Study, Bornholm, BOFA, 2009-2011, Denmark**

Technical review of existing waste-to-energy (20,000 tpa) facility and preparation of decision-making basis.

2009-ongoing: Bettina was the Project Manager for the study on evaluation of the existing WtE facility at Bornholm and proposal for renovation/upgrading of the facility.

**WtE Study, Stantec, 2009-2010**

Ramboll assisted a local consultancy firm in technical assistance with special emphasis on an energy recovery technology review, air pollution control system and EU regulatory requirements.

2009-2010: Bettina was the Project Manager and was responsible for Rambolls actions.

**WtE Study, Lancaster County Solid Waste Management Authority, 2009-2010, United Kingdom**

The study defines the scope and overall design parameters for the new facility.

2009-2010: Bettina was the Project Manager on the State-of-the-art study for WtE and the expansion of the existing WtE facility in Lancaster.

**Public Consultation Meeting, Metro Vancouver, 2009-2009, Canada**

Planning and conduct of seminar for the board of Greater Vancouver Waste Authority and its technical staff. The seminar focussed on waste management in Europe and North America

2009: Bettina was invited as technical expert for a public consultation meeting by Metro Vancouver, to exchange knowledge on WtE in Europe.

**New WtE Facility, Kjellerup, L90, 2008-2013, Denmark**

A new green field (220,000 tpa single line) WtE facility will be constructed in Kjellerup. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

2008-ongoing: Bettina is the Project Manager and is responsible for environmental approvals, impact assessment, authority approvals, design specifications, tendering and contracting

**New WtE Facility, West Palm Beach, Malcolm Pirnie, 2008-2013, United States**

A new green field (3 x 240,000 tpa triple line) WtE facility will be constructed in West Palm Beach. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study. Ramboll has in particular assisted with technical specification in the RFP and technical evaluation of the vendor offer.

2008-ongoing: Bettina is the Project Manager for Malcolm Pirnie on technical issues for establishment of the new WtE facility at West Palm Beach, Florida.

**WtE Study, I/S Kraftvarmeværk Thisted, 2008-2013, Denmark**

Project analysis and planning and permits for new WtE facility.

2008: Bettina was the Project Manager for the planning of expansion to the WtE facility (85,000 tpa) in Thisted.

**WtE Feasibility Study, The Region of Peel, Ontario, 2008-2009, Canada**

2008-2009: Bettina was the Project Manager for a feasibility study for a new green-field WtE (250,000 tpa) facility in Peel Region supplying both electricity, district heating and district cooling. Various locations have been analysed.

**New WtE Facility, Hjørring , I/S AVV, 2007-2012, Denmark**

A new brown field (80,000 tpa single line) WtE facility will be constructed in Hjørring with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study. Ramboll is responsible for environmental permitting, authority application and project definition

2007-ongoing: Bettina is the Project Manager for expansion of the new WtE line. Application was sent to the authority in 2008 and the reply was given mid 2010.

**New WtE Facility, Tromsø, Troms Kraft, 2007-2011, Norway**

A new green field (64,000 tpa single line) WtE facility will be constructed in Tromsø. Ramboll acted as EPCM contractor (owners engineer) since the feasibility study. Ramboll was responsible for project definition, tendering and contract negotiation. The project was initiated with a technology assessment study to identify the technology.

2007-2010: Bettina was the Project Manager for the establishment of a green-field WtE facility in Tromsø, Norway.

**New WtE Facility, Hamar, Eidsiva Bioenergi, 2007-2011, Norway**

A new green field ( 72,000 tpa single line) WtE facility will be constructed in Hamar with CHP. Ramboll acted as EPCM contractor (owners engineer) since the feasibility study. Ramboll is responsible for design specifications, tendering, contract negotiation, and follow-up during construction and commissioning.

2007-2010: Bettina was the Project Manager for the establishment of a new green-field WtE facility in Hamar.

**WtE Study, York County Solid Waste and Refuse Authority, 2007-2010, United States**

Ramboll advises the waste authority for their planning of expansion and/or rebuild of the existing WtE facility (220,000 tpa).

2007-2010: Bettina was the Project Manager for Rambolls assistance to York County Solid Waste and Refuse Authority (YCSWRA).

**WtE Study, Northeastern Maryland Waste Disposal Authority, 2007-2010, United States**

Rambolls main task was evaluation of technical proposals for the new WtE Facility

2007-2010: Bettina was the Technical assistance to Northeastern Maryland Waste Disposal Authority for the evaluation of technical bids for the establishment and operation of WtE facilities for Frederic and Carroll Counties (550,000tpa).

**WtE Study, Environment Canada, 2007-2007, Canada**

Status of MSW thermal treatment in Canada.

2007: Bettina was a technical assistance for Environment Canada for a report on WtE in Canada, USA and Europe.

**Feasibility Study, Halton Region, 2007-2007, Canada**

Ramboll was responsible for business case analysis for a new WtE facility

2007: Bettina was the Project Manager for Ramboll's assistance, concerning technology assessment for the Halton Region for a feasibility study of a new WtE facility located at the existing landfill.

**WtE Study, Durham/York Region, MacViro (2006) and HDR (2008), 2006-2008**

2006-2008: Bettina was a Technical Assistance on a WtE study in the Durham/York Region, sub-consultant to MacViro (2006) and HDR (2008).

Bettina was responsible for Ramboll's assistance to Durham and York Region during siting, tendering, contracting and establishing a new WtE line (150,000 tpa).

**Retrofit of WtE Facility, Vienna, Fernwärme Wien, 2006-2007, Austria**

Retrofit of a WtE facility (2x133,000 tpa, dual lines). The retrofit comprised reconstruction and energy optimization of the two incineration lines.

2006-2007: Bettina was the Project Manager for Rambolls assistance to the WtE facility Spittelau in Vienna, Austria, for the planning of reconstruction and energy optimisation of the facility.

**Feasibility Study WtE, Düsseldorf, MVA Flingern, 2006-2006, Germany**

Strategic development of existing WtE facility

2006: Bettina was the Project Manager for a feasibility study and conceptual design for a new facility that will replace the 6 existing WtE facility, all were outdated.

**Feasibility Study WtE, Reykjavik, SORPA, 2006-2006, Iceland**

2006: Bettina was the Project Manager for a technical and economic assessment for the establishment of a new WtE facility (120,000 tpa) covering Reykjavik, Iceland, and surrounding municipalities. The study included technology assessment.

**Feasibility Study WtE, Vilniaus Energija/ Dalkia, 2006-2006, Lithuania**

2006: Bettina was the Project Manager for planning and tendering of a hazardous waste incineration facility.

**WtE Study, Esbjerg, L90, 2005-2005, Denmark**

2005: Bettinas main tasks included trouble shooting at a facility operating with technical problems and with exceeding environmental requirements.

**Retrofit of WtE Facility, ASM Brescia, 2004-2006, Italy**

Retrofit of a WtE facility (3x184,000 tpa, triple lines). The retrofit comprised of upgrading of existing WtE facility, including crane automation and establishment of a new crane.

2005: Bettina was the Project Manager for the establishment and automation of a waste crane system to achieve fully automatic crane operation, including technical specification, tender and project follow-up.

**Retrofit of WtE Facility, IRF, 2004-2006, Faroe Islands**

The retrofit comprised of replacement of an electrostatic precipitator with a semi-dry flue gas treatment plant including a new building and foundations etc. The capacity of each of the two incineration facility is 20,000 tpa. Ramboll is responsible for the complete project from planning, tendering and contract negotiation and contract follow-up.

2003-2007: Bettina was the Project Manager for the upgrading of the APC equipment at the WtE facility in the Faroe Islands.

**Retrofit of WtE Facility, ASM Brescia, 2004-2006, Italy**

Retrofit of a WtE facility (3x184,000 tpa, triple lines). The retrofit comprised of upgrading of existing WtE facility, including crane automation and establishment of a new crane.

2006: Bettina assisted ASM Brescia in assessing technology for a slag handling and treatment facility to recover recyclable metals.

**Retrofit of WtE Facility, Hjørring, I/S AVV, 2003-2007, Denmark**

Retrofit of a WtE facility (48,000 tpa, single line). The retrofit comprised of upgrading the existing WtE facility, including the flue gas treatment system. Ramboll is responsible for the complete upgrade from planning, tendering, contract negotiation and commission, including civil work

2003-2007: Bettina was the Project Manager for the upgrading of the flue gas treatment system at the WtE plant.

**New WtE Facility, Kolding, Trekantområdets Affaldsselskab I/S, 2003-2007, Denmark**

A new brown field (80,000 tpa single line) WtE facility was constructed in Kolding with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

2003-2004: Bettina was the Project Manager for the establishment of a new WtE facility. Responsible for the environmental impact assessment, authority approval, tender specification and negotiation.

**Retrofit of WtE Facility, Hjørring, I/S AVV, 2002-2003, Denmark**

Retrofit of a WtE facility (48,000 tpa, single line). The retrofit comprised of Upgrading of existing WtE facility, including flue gas treatment system.

2002-2003: Bettina was the Project Manager for the extension of a waste pit as well as the establishment of a new waste crane, crusher and weighbridge.

**Feasibility Study, Malmö VA-verket, 2002-2003, Sweden**

2002-2003: Bettina was the Project Manager for a feasibility study of the establishment of a sludge drying system and subsequently co-incineration.

**New WtE Facility, Næstved, I/S FASAN, 2001-2007, Denmark**

A new green field ( 65,000 tpa dual line) WtE facility was constructed in Næstved with CHP. Ramboll acted as EPCM contractor (owners engineer) since the feasibility study.

2003-2007: Bettina was the Project Manager for the extension of the WtE facility by a new unit and upgrading of the flue gas treatment systems of two existing units.

**Retrofit of WtE Facility, Hørsholm, I/S Nordforbrænding, 2001-2005, Denmark**

Retrofit of a WtE facility (88,000 + 3 x 24,000 tpa, quad line). The retrofit comprised of upgrading of existing WtE facility, including SNCR. Ramboll was responsible for tendering, contract negotiation and follow-up during construction and commissioning

2002-2003: Bettina was the Project Manager for the upgrading of the flue gas treatment systems at three existing lines.

Bettina was also the Project Manager for the planning of establishment of a reception and co-incineration system for the treatment of dewatered sewage sludge.

**Feasibility Study of treatment of meat and bone meal, I/S Nordforbrænding, 2001-2005, Denmark**

Retrofit of a WtE facility (88,000 + 3 x 24,000 tpa, quad line). The retrofit comprised of upgrading of existing WtE facility, including SNCR

2002: Bettina was the Project Manager for a feasibility study of the treatment of meat and bone meal at I/S Nordforbrænding.

**WtE Study, Municipality of Torshavn, 2001-2003, Faroe Islands**

2001-2003: Bettina was the Project Manager for the cost benefit analysis for extension of a WtE facility with a new 35,000 tpa WtE facility including connection to the district heating system.

**WtE Study, I/S Nordforbrænding, 2001-2001, Denmark**

2001: Bettina was the Project Manager for a conceptual project on pretreatment plants for bio-waste at the WtE facility.

**WtE Study, I/S Nordforbrænding, 2000-2002, Denmark**

2000-2002: Bettina was the Project Manager for the planning of a system for healthcare risk waste and special waste for co-incineration at the WtE facility.

**Sewage sludge drying facility, Ringsted Municipality, 1998-1998, Denmark**

1998: Bettina was responsible for the preparation of tender documents for a sewerage sludge drying facility.

**New WtE Facility, Nykøbing F., I/S REFA, 1997-2000, Denmark**

A new brown field (72,000 tpa single line) WtE facility was constructed in Nykøbing with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

1997-1998: Bettina was the Assisting Project Manager for the extension of the WtE facility.

**New WtE Facility, Nykøbing, I/S REFA, 1997-2000, Denmark**

A new brown field (72,000 tpa single line) WtE facility was constructed in Nykøbing with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

1998: Bettina was responsible for a feasibility study of the establishment of a sewerage sludge treatment facility.

**Retrofit of WtE, Næstved, I/S FASAN, 1997-2000, Denmark**

Ramboll was engaged as a trouble shooter due to technical problems and low availability. After rebuilding the facility achieved full availability.

1997-2000: Bettina was the Project Manager for the reconstruction of WtE units 2 and 3.

**New WtE Facility, Spildevandscenter Avedøre I/S, 1995-2001, Denmark**

A new brown field (16,000 tpa single line, on dry basis) WtE facility was constructed in Copenhagen. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

1997: Bettina was in charge of preparation of tender documents for a fluidised bed incineration plant for sewerage sludge.

**WtE Study, I/S KARA, 1995-1996, Denmark**

1995-1996: Bettina prepared the solid waste management strategy for the intermunicipal waste management company for 1996-2008.

**New WtE Facility, I/S Nordforbrænding, 1994-2000, Denmark**

A new brown field (80,000 tpa single line) WtE facility was constructed in Hørsholm with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study.

1997-2003: Bettina was the Project Manager for the extension of a WtE facility with a new combined heat and power producing unit.

**New WtE Facility, Hjørring, I/S AVV, 1993-2000, Denmark**

A new brown field (50,000 tpa single line) WtE facility was constructed in Hjørring with CHP. Ramboll acted as EPCM contractor (owners Engineer) since the feasibility study. Ramboll is responsible for the complete project from design specification, tendering, contract negotiations, contract follow-up during construction and commissioning.

1996: Bettina was the Project Manager for the extension of a WtE facility.

**Hazardous Waste Studies, Central and Eastern Europe, 1990-1995**

1990-1995: Bettina worked with several hazardous waste projects in Central and Eastern Europe while working at Chemcontrol.

**Industrial Inspector, Herlev Municipality, 1990-1990, Denmark**

1990: Bettina was a Industrial Inspector responsible for supervision, inspection and environmental approval of process equipment under the Danish Environmental Protection Act.



**Survey on hazardous waste collection from households, Danish Technological Institute, 1989-1989, Denmark**

1989: Bettina conducted a nation-wide survey on collection systems for hazardous waste from private households. The project was summarised in Environmental Report 1990:12 of the Nordic Council: 'Collection Systems for Hazardous Waste from Households'.

**Household Hazardous waste, Vejle Municipality, 1989-1989, Denmark**

1989: Bettina was responsible for the evaluation of a new system for the collection and sorting of hazardous waste from private households with special attention to efficiency, safety and operating costs.

**LANGUAGES**

Danish, English and partly Norwegian, Swedish, German