

PREFACE

The Baltic Sea catchment area is approximately 1.8 million km² and contains fourteen countries, nine of which at the shores of the Baltic Sea. In the end of the 1990's, big gaps existed in terms of economic development among the countries in this region. Nevertheless, a strong feeling of historical connection established itself during hundreds of years demanding action to reduce this gap. During the last twenty years, these differences have been reduced and the distances have been shortened mainly thanks to the development of new means of communication. In 1997, the City of Kalmar celebrated its 600th anniversary of the union between the Nordic countries and the first Kalmar ECO-TECH Conference was organized. A major goal of the University of Kalmar in Sweden (HiK) was to promote research and education cooperation among the countries around the Baltic Sea to obtain an improved sustainability. The strategy established by HiK to reach this goal was to closely cooperate with the local actors in trade and industry, Kalmar ECO-TECH embracing both this goal and the strategy. Thereafter, Kalmar ECO-TECH, later named Linnaeus ECO-TECH, has been held every second year, except for 2010 when Kalmar University and Växjö University were merged together to form the Linnaeus University. Twenty years has passed since the start and we might have the feeling that we have not done enough for the environment and perhaps have not met the goal for a sufficient sustainability. Can we ensure that the pollution of the air, soil and water is decreasing? If not, what can we improve in the future? How can we develop our message to the new generation and recruit youngsters to become environmental engineers and environmental scientists that will perform better in the future?

During all its years, the main objective of Kalmar ECO-TECH has been to promote cooperation between the academia, trade and industry in the Baltic region and expand the usage of a cleaner technology by engaging companies, industries, city-engineers and administrators. The overruling goal has been to solve the existing environmental problems through technological solutions but also to point at new ways of thinking, producing, consuming and recycling and/or reuse. More and more obvious the environmental issues have risen from being just local and regional to a global concern. Pollution has an ever more transboundary nature and affects everyone. Consequently, the Kalmar ECO-TECH themes have changed over the years (**Figure 1**). In particular, since 2005, the conference has opened up not only to the Baltic region but to the whole world. During the last decades, the global warming and CO₂ emissions have been a hot (!) topic not only among scientists but also among politicians and the society as a whole. The ECO-TECH' 07 session paid special attention to gaseous emissions related to climate changes and renewable energy from waste. **Table 1** shows some events connected to Kalmar ECO-TECH when the Linnaeus University, formerly University of Kalmar, participated. One activity worth to highlight is the Youth Environmental Conference ECOBALTICA that has been held in Saint Petersburg every second year since 1996 in cooperation with the Assembly of Young Scientists of St. Petersburg, the State Committee on Higher Education of the Russian Federation, the City Administration of St. Petersburg, and St. Petersburg State Technical University in Russia and this year in Moscow at the Federal Agency for Scientific Organizations (FASO). Constantly, this international conference has been devoted to youngsters by open up the possibilities for undergraduate and graduate students from the countries in the Baltic Region to present their theses and other academic projects, to meet senior researchers and representatives from the trade and industry sectors and develop their business and academic skills.

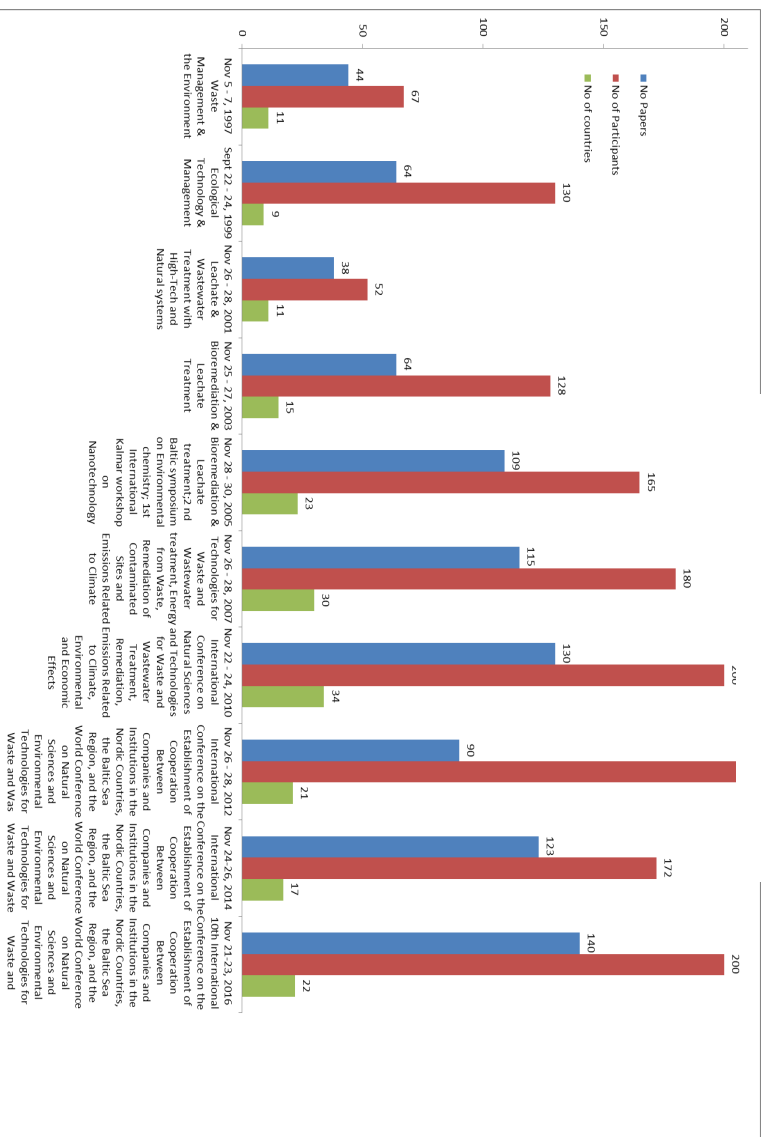


Figure 1. Kalmar ECO-TECH’ 1997, 1999, 2001, 2003, 2005, 2007, 2010, 2012, 2014, 2016. The themes are highlighted and the number of different papers, participants and countries are given.

Table 1. Events organized during 1996–2016 related to the sustainable development in the Baltic Sea Region, mostly in cooperation with Kalmar or Linnaeus University.

Year	Activity	Main institutions and persons involved
1996	The idea about Kalmar ECO-TECH arises	Åke Erlandsson AB Gustaf Kähr and William Hogland, University of Kalmar
5-7 Nov. 1997	The 1 st Kalmar ECO-TECH Seminar on Waste Management and the Environment was organized, to be held every second year in Kalmar	Head of Department of Technology, Göran Borgö and William Hogland, University of Kalmar
1998	Cooperation agreement-International Youth Environmental Conference ECOBALTICA to be held every second year in St. Petersburg, Russia	William Hogland University of Kalmar and Vasili Rud St. Petersburg State Technical University, Russia
5-7 Jun, 1998	The Ecological Symposium, Gdansk, Oruma, Poland	Piotr Kowalic, the Technical University of Gdansk, Poland
22-26 Jun, 1998	The Youth Environmental Conference ECOBALTICA '98, 22-26 June 1998, St. Petersburg, Russia	Vaslii Rud and William Hogland. State Committee on Higher Education of the Russian Federation, the City Administration of St. Petersburg, St. Petersburg State Technical University, Russia
1998	Cooperation agreement between Kalmar University and St. Petersburg State Technical University (renewed since then)	Vice Chancellor Örn Taube, Professor William Hogland, Vaslii Rud St. Petersburg State Technical University
2-20 Nov, 1998 11-17 Apr, 1999	Advanced International Training Programme, Sida Course in "Solid Waste Management in Eastern Europe": Part 1 in Stockholm, SWECO, Sweden; Part 2 in Yalta, Ukraine	SWECO, Stockholm
26-29 Nov, 1998	The 5 th Danish-Polish Workshop on "Biofuels", Ecological Education Center, Starbienino, Poland	Piotr Kowalic the Technical University of Gdansk, Poland, Roskilde University Centre, Denmark and Free University of Berlin, Germany
2-27 Aug, 1999	International Course Agenda 21: Planning and Management for Sustainability in the Baltic Sea Region	University of Kalmar
22-24 Sept. 1999	Kalmar Eco-tech '99, The 2 nd Seminar on Establishment of Cooperation between Companies/Institutions in the Nordic Countries and the Baltic Countries	Professor William Hogland and his Team at the University of Kalmar
2-5 Dec, 1999	The 6 th Danish-Polish Workshop on "Biomass for Energy", Starbienino, Poland	Technical University of Gdansk, Poland, Roskilde University Centre, Denmark, Free University of Berlin, Germany, Piotr Kowalic, William Hogland
14-15 Dec, 1999	Seminar on "New Environmental Technology for Processing Landfill Leachate", Siauliai, Lithuania	Dr Lennart Mårtensson, University of Kristianstad, Sweden
25-29 Jun, 2000	The 1 st International Workshop of the Baltic Test Team: Global International Waters Assessment-GIWA UNEP/GEF	GIWA UNEP/GEF, University of Kalmar, Marcia Marques and William Hogland
26-30 Jun, 2000	The Youth Environmental Conference ECOBALTICA '00, St. Petersburg, Russia	Vaslii Rud, International Director and co-organizer William Hogland; State Committee on Higher Education of the Russian Federation, the City Administration of St. Petersburg, St. Petersburg State Technical University, St. Petersburg, Russia
12-16 Aug, 2000	The 2 nd International Workshop of the Baltic Test Team: International Global International Waters Assessment-GIWA UNEP/GEF	GIWA UNEP/GEF, University of Kalmar, Marcia Marques and William Hogland
7-10 Dec, 2000	the 7 th Danish-Polish Workshop on "Biomass for Energy, Starbienino, Poland	Technical University of Gdansk, Poland, Roskilde University Centre, Denmark and Free University of Berlin, Germany, Piotr Kowalic, William Hogland
18-20 Dec 2000	The 3 rd International Workshop of the Baltic Test Team: Global International Waters Assessment-GIWA UNEP/GEF	GIWA UNEP/GEF together with Professor William Hogland and Marcia Marques
17-18 Sep, 2001	The First International Symposium: Environmental Problems in the Baltic Region States, Environmental Friendly Treatment Technology for Waste Water in the Baltic Sea Region, Siauliai, Lithuania	Dr Lennart Mårtensson University of Kristianstad, Sweden
26-29 Sep, 2001	The First Baltic Symposium on Environmental Chemistry	Professor Toomas Tenno, University of Tartu, Estonia
26-28 Nov. 2001	Kalmar Eco-tech '01 Leachate and Wastewater Treatment with High-tech and Natural Systems	Professor William Hogland and his Team at University of Kalmar

21-25 Oct, 2002	The Youth Environmental Conference ECOBALTICA 02, St. Petersburg, Russia	Vaslii Rud, International Director and William Hogland; State Committee on Higher Education of the Russian Federation, the City Administration of St. Petersburg, St. Petersburg State Technical University, St. Petersburg, Russia
22 Oct, 2002	Sustainable Water Treatment and Water Quality Control Systems: Leachate Treatment from MSW and Industry Landfills; The 2 nd Workshop "Sustainable Leachate and Waste Water Management using High-tech and Natural Systems"	William Hogland, Kalmar University and St. Petersburg State Polytechnical University (SPbSPU), St Petersburg, Russia
11-13 Apr, 2003	Decision Making in Water Management Network	Institute of Ecology, Tallinn, Estonia
12-15 Jun, 2003	The 8 th Danish-Polish Workshop on Biomass for Energy, Starbienino, Poland	Professor Piotr Kowalic, the Technical University of Gdansk, Poland, Roskilde University Centre, Denmark and Free University of Berlin, Germany
28 Nov, 2003	The gender perspective "Women in Technology with focus on Bioremediation and Leachate Treatment in the Baltic Region"	William Hogland, University of Kalmar
25-27 Nov, 2003	Kalmar Eco-tech '03 Bioremediation and Leachate Treatment – The 4 th International Conference on the Establishment of Cooperation Between Companies and Institutions in the Nordic Countries and the countries in the Baltic Sea Region	Professor William Hogland and his Team at University of Kalmar
16-18 Jun, 2004	The 5 th Youth Environmental Forum ECOBALTICA '2004, St. Petersburg, Russia	Vaslii Rud, International Director and William Hogland; State Committee on Higher Education of the Russian Federation, the City Administration of St. Petersburg, St. Petersburg State Technical University, St. Petersburg, Russia.
2-24 Sep, 2004	International Conference "Strengthening Academic Cooperation in Environmental Issues in the Nordic and Baltic Sea Region, Uppsala, Sweden	St. Petersburg State University for Engineering and Economics (ENGECON) and Swedish University of Agricultural Sciences (SLU)
6-10 Oct, 2004	International PhD course Solid Waste Management in Nordic Countries and St. Petersburg.	Esa Marttila and Mika Horttaniainen, Lappeenranta University in Finland, Vadim Chekalin, St. Petersburg State University of Engineering and Economics, Russia and William Hogland, University of Kalmar
4-5 Oct, 2005	Seminar and Study Visit in Kalmar for the Young Scientist Delegation from St. Petersburg Polytechnic University, Russia	William Hogland for the Royal Swedish Academy of Engineering Sciences
2002-2004	The Baltic Sea Network for Leachate and Wastewater Treatment with emphasis on High-tech in Combination with Nature Based Systems	William Hogland, University of Kalmar and Felix Stolberg at the Kharkov State Academy of Municipal Economy, Ukraine
2004-2007	The Baltic Sea Region-Ukrainian Network on Bioremediation and Treatment of Leachate from Landfills with Emphasis on Persistent Organic Compounds	William Hogland, University of Kalmar and Felix Stolberg at the Kharkov State Academy of Municipal Economy, Ukraine
2004	Education cooperation on Master Course in Environmental Engineering with researchers/teachers at the Danish Technical University in Denmark, Telemark College in Norway; University of Kalmar	Rune Bakke, Telemark University College in Norway
28-30 Nov, 2005	Kalmar Eco-tech '05 Waste to Energy, Bioremediation and Leachate Treatment; The 2 nd Baltic Symposium on Environmental Chemistry; the First Kalmar Nanotechnology Workshop	Professor William Hogland and his Team at University of Kalmar and The European Association for Chemical and Molecular Sciences, the Swedish Chemical Society and the Trans Regional Network NanoGrowth (together with Dr Bo Carlsson)
26-28 Jun, 2006	The 6 th International Youth Environmental Forum of Baltic Region Countries ECOBALTICA 2006, St. Petersburg, Russia.	Vaslii Rud, International Director, William Hogland, State Committee on Higher Education of the Russian Federation, the City Adm. of St. Petersburg, St. Petersburg State Technical University, Russia
28 Jun, 2006	Establishment of the "Baltic Scientific Ecological Centre"	Professor William Hogland, University of Kalmar
21-25 Aug, 2006	SUSBUS project Workshop: European Project _ JEP-23100-2002 "Developing Sustainable Business Patterns in Ukraine"	Felix Stolberg Kharkov State Academy of Municipal Economy, Ukraine; Pekka Peura, Levon Institute, Finland, William Hogland and Marcia Marques, University of

		Kalmar
26-28 Nov. 2007	Kalmar Eco-tech 2007, The 6 th International Conference on Technologies for Waste and Wastewater Treatment, Energy from Waste, Remediation of Contaminated Sites, Emissions Related to Climate	Professor William Hogland and his Team at University of Kalmar
26-28 June 2008	The International Youth Science Environmental Forum ECOBALTICA 2008	Michael Fiodorov, Vaslii Rud, International Director, William Hogland; St. Petersburg State Polytechnic University (SPbSPU), Ecology Laboratory of Baltic Sea Region, Russia
2007-2009	JOCCOW – joint capacity building concerning waste management,	Partners: the Municipality of Kalmar (Sweden), Kaliningrad City Hall, Municipal Institution Environmental Centre «ECAT-Kaliningrad», Kaliningrad State Technical University, Municipal enterprise «Chistota», University of Kalmar (Sweden), Association for Waste Management (Sweden)
7 Oct. 2008	Seminar within the JOCCOW Project, Kaliningrad, Russia. Speaker on “Perspective for improving the system of waste management”.	See above
2010-2012	Sustainable innovations and treatment in industrial wastewater clusters (STInno), 2010-2012, EU FPT- REGIONS 2009	Regional Council of Kalmar county – Linnaeus University (Prof William Hogland with a consortium research also from Finland, Greece, Italy, UK)
22-24 Nov. 2010	Linnaeus ECO-TECH 2010 – The 7 th International Conference on Natural Sciences and Technologies for Waste and Wastewater Treatment, Remediation, Emissions related to Climate, Environmental and Economic Effects.	Professor William Hogland and his Team at the Linnaeus University
Sept 29 – Oct 1, 2011	The International Youth Science Environmental Forum ECOBALTICA 2011	Michael Fiodorov, Vasilii Rud, International Director, William Hogland; St. Petersburg State Polytechnic University (SPbSPU), Ecology Laboratory of Baltic Sea Region, Russia
2011-2012	NOVA-FoU project – “ Pre-study for Sediment Mining and Remediation in Oskarshamn Harbour”	Professor William Hogland and his team at the Linnaeus University. Partnership with the Municipality of Oskarshamn.
2011-2013	Strukturfonder - Regionförbundet –EU project – “Plattform for Triple Helix Cooperation on Industrial Water Handling in Småland Region and the Islands” based on the KK-Foundation project “Integrated Approach for Industrial Wastewatr and Stormwater Management in Wood-Industry sector”.	Environmental Science and Engineering Group under supervision of Prof William Hogland in cooperation with the business sector consisting of 5 companies. The project has the cooperation also Kalmar Municipality and with Ann-Christin Bayard from Sustainable Southeast Sweden AB (network of 21 companies) that has been working as an intermediate between academia and the industries.
2011-2013	Sida – Project “The Triple Helix Concept applied in the Baltic Sea Region”.	Professor William Hogland with the Environmental Science and Engineering Group. The project aims to teach undergraduate students the Triple Helix concept in the Baltic region and to increase cooperation between countries, focusing on water treatment in wood industry
2012-2015	Swedish Institute – Project “ Closing the Life-cycle of Landfills – Landfill Mining in the Baltic Sea Region for Future”	Linnaeus University (SWE), Riga Technical University (Latvia), Estonian University of life Sciences (EST), University of Padova (Italy), St. Petersburg State Polytechnical University (RUS), Waste Management Association of Latvia, Estonian Waste Management Association, RGS 90 (SWE), Saarema Landfill AB (Estonia), GLT Norway, Waste Management Association of Norway, LundaHydro AB (SWE), Avfall Norge (Norway).
2012-2013	VINNOVA – Project “Integrated Waste Management Technology for Effective Biogas Production”. This project consists of cooperation between the academic sector and industries from Sweden and Brazil.	Linnaeus University (SWE), Rio de Janeiro Federal University (BRA), Rio de Janeiro State University (BRA), Essencis (BRA), Institute of Water Problems and Land Reclamation NAAN (UKR), SP Technical Research Institute of Sweden, Läckeby Water Group, JOAB, Wastec, Kalmar Sund Region Waste Management Company, Sustainable Sweden Southeast, Mindmancer AB, LundaHydro AB, Flexus Balasystem AB

<p>2013</p>	<p>February 2013: International PhD course in Landfill Mining, in Estonia</p> <p>18.09.13 Seminar and Closure ceremony of the Kudjape landfill, Estonia</p> <p>International seminar „Waste Dumpsite Recovery – Challenges for Latvia and Experiences of Europe Countries” Tuesday, 2013. 10th December, Riga, Latvia</p> <p>Landfill Mining project Vika Landfill seminar, Katrineholm (2013-04-25)</p>	<p>Organisers: William Hogland, Linnaeus University; Mait Kriipsalu Estonian University of Life Sciences; Gintaras Denafas, Kaunas University of Technology</p> <p>Official persons from Swedish EPA, Swedish Institute; William Hogland Linnaeus University; Estonian Minister of Environment; Mait Kriipsalu Estonian Uni of Life Sciences; MoE, Estonia; Latvia Waste Management Association; Kyiv Nat. University the Federal Agency for Scientific Organizations (FASO)</p> <p>Organizing: „Waste Management Association of Latvia” (LASA) in cooperation with Environment Protection Department, the Ministry of Regional Development and Tehniska Verken, Linnaeus University, RGS 90, LundaHydro AB</p> <p>Tehniska Verken, Linnaeus University, RGS 90, LundaHydro AB</p>
<p>2014</p>	<p>ERASMUS visits and International seminar “Landfill mining in the context of global environmental mitigation” Department of Environmental Technology, Kaunas University of Technology, Kaunas, Lithuania 06-11.04.2014</p> <p>Seminar on Landfill mining, Sättra Gärd, Sweden 23 april 2014</p> <p>International PhD course in Landfill mining I (21-25/4) – II (24 July) , Sättra gård, Sweden, 2014</p>	<p>Organisers: Gintaras Denafas, Kaunas University of Technology, William Hogland, Linnaeus University, SE; Mait Kriipsalu, Estonian University of Life Sciences others were Kyiv National T. Shevchenko University and Lappeenranta University of Technology</p> <p>Ragnsells and Linnaeus University</p> <p>Ragnsells, Linnaeus University and Estonian University of Life Sciences</p>
<p>2015</p>	<p>The Elsevier Atlas Award was delivered 28 of May 2015 in the Netherlands</p> <p>International Summer School on Waste Management and Circular Economy, 9 June to 12 June 2015, Lappeenranta FINLAND</p> <p>Mining in Sludge Landfill: characterization of sludge from drinking water treatment, and metal extraction (PhD Course). SWEDEN, June 12–18, 2015.</p> <p>Landfill Mining and waste characterisation. ESTONIA (PhD course), June 18-22, 2015.</p>	<p>The Elsevier Atlas Award for “Research for a better world” article “Solid waste management challenges for cities in developing countries” by Lilliana Abarca Guerreroa, Eindhoven University of Technology and Costa Rica Institute of Technology, Ger Maasa, Eindhoven University of Technology, and William Hogland, Linnaeus University, (doi:10.1016/j.wasman.2012.09.008).</p> <p>Organised by: Mika Horttanainen LUT Environmental Technology, Finland; William Hogland, Linnaeus University, Sweden; Mait Kriipsalu, Estonian University of Life Science, Estonia</p> <p>Organised by: William Hogland, Linnaeus University and Kenneth. M. Persson, Lund University, Sweden and Sydsvatten; Mait Kriipsalu, Estonian University of Life Sciences (EMU); Estonia</p> <p>Organised by: Kaunas University of Technology; William Hogland, Linnaeus University; Mait Kriipsalu, Estonian University of Life Sciences</p>

2016	<p>BOVA Intensive Master Course Waste to Resource in Baltic States in 2020 24th-29th April 2016, Estonia</p> <p>International Scientific-Practical Conference Modern Engagering Technologies and Environmental Protection 19-20 May, 2016, Kutaisi, Georgia</p> <p>International Science Environmental Conference Eco-Baltica, Moscow, Russia, 21 October, 2016</p>	<p>Organised by ASU (Kaunas), LLU (Jelgava), EMU (Tartu) and Linnaeus University Sweden</p> <p>Akaki Tsreteli State University, Kutaisi, Georgia</p> <p>Organised by Alexey Glynushkin, William Hogland, Vasilii Rud at the Federal Agency for Scientific Organizations (FASO)</p>
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In the Linnaeus ECO-TECH 2014 Conference, the Triple Helix concept became even stronger and the concept “Beyond the Zero Waste” was introduced which encourages recovery of all materials lost during the entire life cycles of different products manufactured, which still are available in different sinks such as landfills, sediments of rivers, ocean, etcetera. All waste, materials and chemical compounds lost as sludge, slag, harbor sediments and others can, in principle, be returned to the anthropogenic loops and the toxics substances could be removed from the circuits and handled in an environmental friendly way. The long-term goal is to apply such an innovative approach in an environmentally and economically efficient way, making use of the accumulated knowledge, including reused and/or recycled materials being bound in urban and rural structures. This year, we are grateful to the administrative secretary Jelena Lundström, the staff of the Environmental Science and Engineering Research Group: Fabio Kaczala, Joacim Rosenlund, Yahya Jani, Parisa Hassanzadeh and Ann-Christin Bayard from Sustainable Sweden South East all of which made it possible to organise the Swedish workshop: “Remediation of Oskarshamn harbor – new knowledge and new possibilities.

The Kalmar ECO-TECH sessions involved many influential persons who contributed to make the conference possible. Particularly I would like to mention Prof. Vasilii Rud, St. Petersburg State Polytechnical University that has cooperated in organizing both the Kalmar ECO-TECH in Kalmar and the ECOBALTICA conferences in St Petersburg. The idea behind the Kalmar ECO-TECH was originally formulated together with Åke Erlandsson, Environmental Manager at AB Gustaf Kähr in Nybro. Note that the first Conference in 1997 was made possible thanks to Göran Borgö and Göran Johansson, both former head of the Department of Technology, University of Kalmar. The first conference also received valuable support from the former Mayor of Kalmar Anders Engström and, during the latest conferences, by his successor, Mayor Kjell Henriksson.

The Region Council in the county of Kalmar, represented by Håkan Brynielsson and his colleagues has also embraced the idea behind the Conference, as well as Jan Hagel, Omvärldskommunikation and the Kalmar County Governor Sven Lindgren and later Stefan Carlsson. Other important contributors have been Hans Dahl, Kalmar Vatten och Renhållning and Lars Kylefors, Vatten och Samhällsteknik as well as Ragn-Sells plus the Swedish Association for Waste Management actively have supported the Conference. Bernth Norén at the XL-laboratory, University of Kalmar has been a big help providing many good ideas to improve the contents of the program.

The Linnaeus ECO-TECH has been possible to carry out thanks to the financial support of the following institutions: AB Gustaf Kähr, Brofästet Hotel & Conference, E.ON, Flexus Balasystem, IVA – The Royal Swedish Academy of Engineering Sciences, Kalmar Energi, Knowledge Foundation, KSRR, Linnaeus University, Länsstyrelsen Kalmar län, Ragn-Sells AB, Sida – Swedish International Development Cooperation Agency, STINT – The Swedish

Foundation for International Cooperation in Research and Higher Education, Sustainable Sweden Southeast AB, Swedish Institute, The Regional Council in Kalmar County, Tillväxtverket – European Regional Development Fund, Vatten och Samhällsteknik, VINNOVA – The Swedish Governmental Agency for Innovation Systems and others.

The memorable 10-year celebration in 2007 of what now is the Linnaeus ECO-TECH, was held the same year as the University of Kalmar celebrated its 30th year Anniversary. Kalmar ECO-TECH' 07 was our humble tribute to this event. Similarly, the Linnaeus Eco-tech 10 on 22-24 November 2010 was our tribute to the establishment of the Linnaeus University on the 1st January 2010 as a fusion between the University of Kalmar and Växjö University. The Linnaeus ECO-TECH 2012 meant an opportunity to strengthen the Linnaeus University by moving towards the established goals of internationalization of the Småland Region. In this conference, the Triple Helix concept was highlighted as well as urban mining, landfill mining, glassmining and harbour mining. On behalf of the Linnaeus University, all participants from different countries who during the years have contributed to this conference, by being active all these years, with new research ideas and willingness to share experience and knowledge with colleagues were acknowledged.

In 2012, many thanks were given to Joacim Rosenlund, the administrative secretary of the conference, the colleagues from LNU Malin Bolander and Anna Gustavsson, and the Environmental Science and Engineering Research Group involving: Marcia Marques, Fabio Kaczala, Amit Bhatnagar, Eva Kumar, Henric Hansson, Henrik Svensson, Sawanya Laohaprapanon and Muhammad Assim, and in particular the Local Programme Committee including among others: Erik Ciardi, the Region Council in the County of Kalmar, Ann Christin Bayard from Sustainable Sweden South East, Kerstin Linsved, RagnSells and Lars Kylefors, Vatten och Samhällsteknik.

The Linnaeus ECO-TECH 2014 featured the Triple Helix concept and the concept “Beyond the Zero Waste” was introduced which encourages recovery of all materials lost during the entire life cycles of different products manufacture and still available in different sinks such as landfills, sediments of rivers, and ocean, etcetera. All the waste, materials and chemical compounds lost such as sludge, slag, harbour sediments and other residuals can, in principle, be returned to the anthropogenic loops and the toxic substances could be removed from the circuits and handled environmental friendly. The long-term goal is to apply such innovative approach in an environmentally and economically efficient way, making use of the accumulated knowledge, including the reuse and/or recycling of materials bound in the urban and rural structures. On this occasion, the administrative secretary Jelena Lundström, the staff of the Environmental Science and Engineering Research Group (ESEG): Fabio Kaczala, Joacim Rosenlund, Yahya Jani, Parisa Hassanzadeh and Ann-Christin Bayard from Sustainable Sweden South East made it possible to organise the workshop in Swedish: “Remediation of Oskarshamn harbour – New knowledge and new possibilities”.

Since the last conference in 2014, the activities of ESEG has been more and more directed towards “Beyond the zero waste” concept involving research and several, international PhD courses. During one of the PhD courses in Glass mining, seventeen nations were represented. The cooperation with Ragnsells, Glafo and Gothenburg University has increased around Glass mining. Nowadays, Ragnsells is sponsors a PhD candidate in glass mining for ESEG. The Glass mining project sponsored by the Swedish Institute Baltic Sea Unit has played an important role in this research area. Landfill mining activities have continued in Sweden and Estonia. A new profile of landfill mining was entered in cooperation with Sydsvatten for test excavations of landfilled fresh water sludge. An international PhD course was held in field sampling and extraction of Al and Fe from landfill fresh water sludge. The course was carried out in cooperation with Estonian University of Life Sciences, Lund University and Linnaeus University. The project Life Sure – Sediment uptake and

remediation on ecological basis opened the area of harbor, bay and lagoon mining. The project is carried out in cooperation with Kalmar municipality and Techmarket Sweden AB (TechMarket). This has raised the question on construction of “Bank Account” landfill cells for sorting of fine material fractions as in ash, sludge, bottom sediments and polluted soils for later recovery when economic methods for extraction of for instant metals and nutrients will exist. Also the IWAMA project (Interreg Baltic Sea Region) lifts the municipal wastewater treatment plant sludge as a resource for recovery and energy utilisation.

The cooperation with the floor manufacturer AB Gustaf Kähr continues. Very soon a demoplant for the treatment of industrial process water and upgrading of stormwater for industrial use will be implemented in industry. A phytoremediation project in cooperation with the local waste management company KSRR is also running and will result in a doctoral thesis in the beginning of 2017. Another doctoral degree thesis on the Triple concept will be presented in february 2017.

During 2016, Jelena Lundström continues to head the administrative work as the project assistant for the conference. The staff of the Environmental Science and Engineering Research Group consisting of: Fabio Kaczala, Joacim Rosenlund, Yahya Jani, Richard Mutafela, Juris Burlakovs, Charlottle Marchand, Marco Tadeu Gomes Vianna and Ann-Christin Bayard at Linnaeus University as well as Jan Stenis from LundaHydro AB have played an important role for the organisation of this 20 years Anniversary conference of Linnaeus Eco-Tech. Stina Alriksson is acknowledged for editing the book of abstracts and proceedings.

Thanks to everyone who contributed to making all the events come true!
Thank You Sponsors!

William Hogland

Chairman of Linnaeus Eco-Tech Conference since the auguration
Professor in Environmental Engineering and Recovery (PhD)
Linnaeus University