

PREFACE

The Baltic Sea catchment area covers approximately 1.8 million km² and encompasses 14 countries of which nine borders the Baltic Sea. In the end of the 1990s, big gaps existed in terms of economic development among the countries in the region. Nevertheless, a strong sense of historical connection established during centuries demanded action to reduce this gap. 1997 to 2016, these differences have levelled, and the distances are shortened mainly thanks to the development of new communication systems. In 1997 the City of Kalmar celebrated the 600th anniversary of the Union between the Nordic countries and the first Kalmar Eco-Tech Conference was organized. One of the main goals of the University of Kalmar (HiK) in Sweden was to promote research and education-cooperation towards sustainability among the countries around the Baltic Sea. The strategy established by HiK to reach this goal was through close cooperation with trade and industry. The Kalmar Eco-Tech conferences embraced both the goal and the strategy. Kalmar Eco-Tech was renamed Linnaeus Eco-Tech. The conference has been held every second year but for 2010 when Kalmar University and Växjö University were merged into the new Linnaeus University. 20 years have passed since the start and we might feel that we have not done enough for the environment and not met the goals for sustainability. Can we ensure that the pollution-load to air, soil and water is decreasing? If not, what can we do better in the future? How can we improve our message to the new generation and recruit youngsters to become environmental engineers and scientists that will do better in the future?

The main objective of Kalmar Eco-Tech through the years has been to promote cooperation between the academia, trade and industry in the Baltic region and expand clean technology by engaging companies, industries, city engineers and administrators. The most important goal has been to solve the existing environmental problems through technological solutions and new ways of thinking, producing, consuming and recycling/reuse. It has become evermore obvious that the environmental issues have risen from local through regional to global concern. Pollution has an evermore transboundary nature and affects everyone. Therefore, the Kalmar Eco-Tech themes changed by time (**Figure 1**). Particularly since 2005, the Conference has been open not only to the Baltic region but to the whole world. During the last decades the global warming and CO₂ emissions have been hot topics, not only among scientists but also among politicians and the society. During Eco-Tech' 07 special attention was devoted to gaseous emissions related to climate changes and renewable energy from waste. **Table 1** shows some events connected to Kalmar Eco-Tech with participation of Linnaeus University and the previous University of Kalmar. One activity 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, St. Petersburg State Technical University, Russia and 2016 in Moscow the Federal Agency for Scientific Organizations (FASO). During the years, this conference has been devoted to youngsters by opening possibilities for undergraduate and graduate students from the Baltic region countries to present their theses and academic projects, to meet senior researchers and representatives from trade and industry and develop business and academic skills.

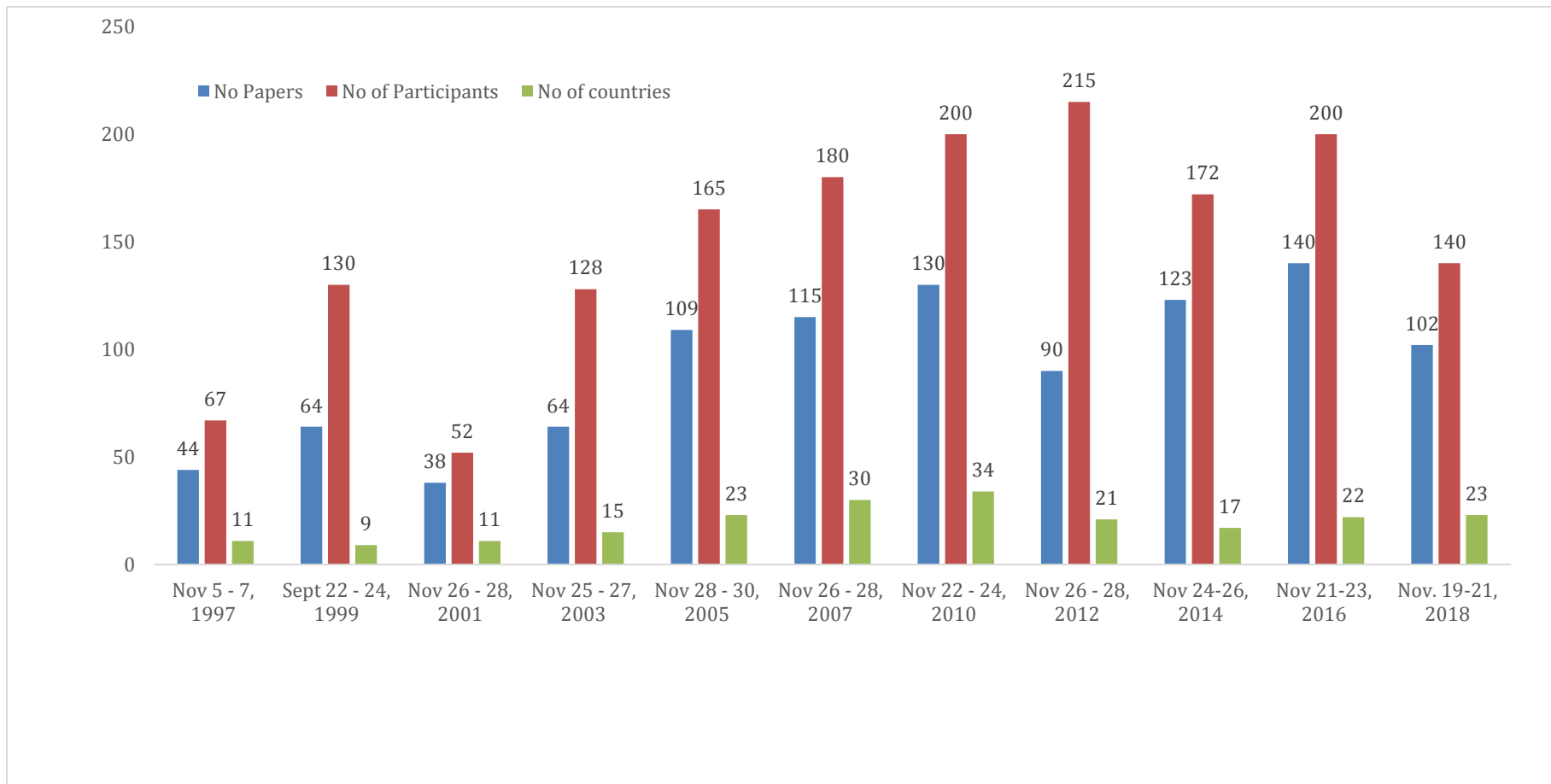


Figure 1. Kalmar ECO-TECH' 1997, 1999, 2001, 2003, 2005, 2007, 2010, 2012, 2014, 2016 and 21. The number of different papers, participants and countries are given.

Table 1. Events organized during 1996-2018 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 on 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, Environmentally 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, Starbieniino, 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 '04, 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 the Swedish University of Agricultural Sciences (SLU)
6-10 Oct, 2004	International PhD course Solid Waste Management in the Nordic Countries and St. Petersburg.	Esa Marttila and Mika Horttanainen, 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 and 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. 10 yr Anniversary of the conference.
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 Establishment of Cooperation between Companies and Institutions in the Nordic Countries and the World.	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, Vasiliy 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 Wastewater 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 five companies. The project has been a cooperation also between Kalmar Municipality and 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	Linnaeus Eco-tech 12, – The 8 th International Conference on Establishment of Cooperation between Companies and Institutions in the Nordic Countries and the World.	H.M. King Calr XVI Gustaf opens the conference and the participated the study trip. Professor William Hogland and his Team at the Linnaeus University organisers.

2012-2013	Vinnova – Project “Integrated Waste Management Technology for Effective Biogas Production”. This project is a 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
2013	February 2013: International PhD course in Landfill Mining, in Estonia Seminar and Closure ceremony of the Kudjape landfill, Estonia (2013-09-18) International seminar „Waste Dumpsite Recovery – Challenges for Latvia and Experiences of Europe Countries” Tuesday, 2013. 10th December, Riga, Latvia Landfill Mining project Vika Landfill seminar, Katrineholm (2013-04-25)	Organisers: William Hogland, Linnaeus University; Mait Kriipsalu Estonian University of Life Sciences; Gintaras Denafas, Kaunas University of Technology 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 Mangement Association; Kyiv Nat. University the Federal Agency for Scientific Organizations (FASO) Organizing: “Waste Management Association of Latvia” (LASA) in cooperation with Environment Protection Department, the Ministry of Regional Development and Tekniska Verken, Linnaeus University, RGS 90, LundaHydro AB Tekniska Verken, Linnaeus University, RGS 90, LundaHydro AB
24-26 Nov. 2014	Linnaeus Eco-tech 14, – The 9 th International Conference on Establishment of Cooperation between Companies and Institutions in the Nordic Countries and the World.	Professor William Hogland and his Team at the Linnaeus University
2014	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 Seminar on Landfill mining, Sättra Gård, Sweden 23 april 2014 International PhD course in Landfill mining I (21-25/4) – II (24 July), Sättra gård, Sweden, 2014	Organisers: Gintaras Denafas, Kaunas University of Technology, William Hogland, Linnaeus University; Mait Kriipsalu, Estonian University of Life Sciences others were Kyiv National T. Shevchenko University and Lappeenranta University of Technology Ragnsells and Linnaeus University Ragnsells, Linnaeus University and Estonian University of Life Sciences
2015	The Elsevier Atlas Award was delivered 28 May 2015 in the Netherlands International Summer School on Waste Management and Circular Economy, 9 June to 12 June 2015, Lappeenranta FINLAND Mining in Sludge Landfill: characterization of sludge from drinking water treatment, and metal extraction (PhD Course). SWEDEN, June 12–18, 2015.	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). Organised by: Mika Horttanainen LUT Environmental Technology, Finland; William Hogland, Linnaeus University, Sweden; Mait Kriipsalu, Estonian University of Life Science, Estonia Organised by: William Hogland, Linnaeus Universtiy and Kenneth. M. Persson, Lund University, Sweden and Sydvatten; Mait Kriipsalu, Estonian University of Life Sciences (EMU); Estonia

	<p>Landfill Mining and waste characterisation. Estonia (PhD course), June 18-22, 2015.</p> <p>The PhytoTech Park Project, 9th October 2015, the Glass Factory, Boda Glasbruk, Sweden</p>	<p>Organised by: Kaunas University of Technology; William Hogland, Linnaeus University; Mait Kriipsalu, Estonian University of Life Sciences</p> <p>Kick off seminar for the international project: Phytoremediation park for treatment and recreation of glassworks contaminated sites, sponsored by the Swedish Institute</p>
21-23 Nov. 2016	Linnaeus Eco-tech 16, – The 10 th International Conference on Establishment of Cooperation between Companies and Institutions in the Nordic Countries and the World.	Professor William Hogland and his Team at the Linnaeus University
2016-2019	Interactive Water Management - IWAMA	Interreg Baltic Sea Region project
2016-2020	Life Sure- Sediment uptake and Remediation on Ecological Basis	Life Environment and Resource Efficiency project
2016	<p>Bova Intensive Master Course Waste to Resource in Baltic States in 2020 24-29 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, Vasiliy Rud at the Federal Agency for Scientific Organizations (FASO)</p>
2017	Sweden Impact Award 2017 for the Triple Helix cooperation on industrial water handling in Småland and the Islands based on a KK-project.	The research project “Integrated approach for Industrial Wastewater and Stormwater Management in Wood-Industry Sector Phases I and II” got the Sweden Impact Award 2017 in the category “Physical Sciences & Engineering” 12-13 June in Stockholm 2017 given by AESIS, Network for advancing & evaluating the societal impact of science.
2017-2020	<p>RBR – Reviving Baltic Resilience</p> <p>EcoBaltica August 2017. Grodno, Belarus.</p> <p>Phyteco 1. Glass Mining and Phytoremediation Baltic Sea Region. Swedish Institute funded course – Glass Mining in Practice (4 ECTS). April 6-13, 2017. Sweden, Orrefors.</p> <p>Phyteco 2. Park design. Swedish Institute funded course. May 2017. Sweden, Orrefors.</p> <p>Sand and Glass Symposium 3-4 March 2017, Riga.</p> <p>Pecec. Remediation in Mining Regions. Swedish Institute funded course. November 2017. Estonia, North-east.</p>	<p>Interreg South Baltic project</p> <p>Organisers: Vasilli Rud and William Hogland</p> <p>Organizers and lecturers, supervisors from Lnu – William Hogland, Yahya Jani, Fabio Kaczala, Joacim Rosenlund, Juris Burlakovs</p> <p>Organizers and lecturers, supervisors from Lnu – William Hogland, Yahya Jani, Fabio Kaczala, Joacim Rosenlund, Juris Burlakovs.</p> <p>Juris Burlakovs. Lecturing and member of Scientific Board</p> <p>Organizers and lecturers, supervisors from Lnu – William Hogland, Juris Burlakovs</p>

19-21 Nov. 2018	Linnaeus Eco-Tech 18, – The 11 th International Conference on Establishment of Cooperation between Companies and Institutions in the Nordic Countries and the World.	Professor William Hogland and his Team at the Linnaeus University
2018	<p>Knowledge and Circular Economy. International Bova and Swedish Institute supported course, April 2018. Pärnu, Estonia.</p> <p>Clay and Ceramics conference 2018: Applications, Mineralogy and Geology. February 3-4, 2018, Riga.</p> <p>Bova Intensive MSc Course: Application of Circular Economy Principles in Landfills, 16-20 April 2018</p> <p>IWAMA 5th International Capacity Development Workshop, 13-15 June 2018, Kalmar, Sweden</p> <p>Agenda 2030, 23 August 2018</p> <p>IWAMA 6th Workshop, 20-21 September 2018, Gdansk. Poland</p> <p>PECEC Closing Workshop and Lasuwama Opening Workshop 22-26th September, 2018</p> <p>Baltic Clean Technology Conference for Sustainable Solutions, 17-18 October 2018, Szczecin, Poland</p>	<p>Co-organizers and lecturers, supervisors from Lnu – William Hogland, Juris Burlakovs</p> <p>Lecturing and Member of Scientific Board from Lnu J. Burlakovs</p> <p>Bova University Network, Estonian University of Life Sciences, Latvia University of Agriculture, Linnaeus University, RWTHAachen University</p> <p>IWAMA Interreg Baltic Sea Region in Cooperation with LNU and Kalmar Vatten. Topic workshop: Nutrient reduction and recovery</p> <p>Organiser Kalmar-Öland UN-association and the Environmental Political Party in Mörbylånga, Öland</p> <p>IWAMA Interreg Baltic Sea Region</p> <p>Organisation Lnu and Akaki Tseretali State University, Kutaisi, Georgia. Swedish Institute project.</p> <p>Prof. William Hogland keynote speaker, www.baltic-clean-technology.com</p>

During the Linnaeus Eco-Tech 2014 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, and which are still available in different sinks (landfills, sediments of rivers, ocean, etc.). 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 toxic substances could be removed from the circuits and handled in an environmentally-friendly way. The long-term goal is to apply such innovative approaches in an environmentally and economically efficient way, making use of the accumulated knowledge, including reuse and/or recycling of materials bound in urban and rural structures. This time many thanks goes 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 making it possible to organise the workshop in Swedish “Remediation of Oskarshamn harbor – New knowledge and new possibilities.

During these years of Kalmar Eco-Tech, many influential persons have contributed to make the conference possible. I would like to acknowledge Prof. Vasilij Rud, St. Petersburg State Polytechnical University that has cooperated organizing both Kalmar Eco-Tech in Kalmar and Ecobaltica in St Petersburg. The idea behind Kalmar Eco-Tech was originally formulated together with Åke Erlandsson, Environmental Manager at AB Gustaf Kähr in Nybro. The first Conference in 1997 was possible thanks to Göran Borgö and Göran Johansson, both former heads 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. During the years, Hans Dahl, Kalmar Vatten och Renhållning and Lars Kylefors, Vatten och Samhällsteknik as well as Ragn-Sells plus the Swedish Association for Waste Management have all worked actively to support the Conference. Bernth Norén at the XL-laboratory, University of Kalmar has helped with ideas to improve the content of the program. Without the financial support of the following institutions, Linnaeus Eco-Tech could not be possible: 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.

In 2007, the memorable 10-year celebration, of what is now Linnaeus Eco-Tech, was held. This was the same year as the University of Kalmar celebrated its 30th year Anniversary. Kalmar Eco-Tech' 07 was our humble tribute to it. In the same way Linnaeus Eco-tech 10, 22-24 November 2010 was our tribute to the establishment of the Linnaeus University on 1st January 2010 as a fusion between the University of Kalmar and Växjö University. The Linnaeus Eco-Tech 2012 was an opportunity to strengthen Linnaeus University by moving towards the established goals of internationalization of the Småland Region. In this conference the Triple Helix concept was highlighted but also urban mining, landfill mining, glassmining and harbor mining. H.M King Carl XVI Gustaf was opening the the conference and he showed very big interested in solid waste and water management and followed the conference participantson the study trip to Moskogens Landfill and to companies as Purac. On behalf of the Linnaeus University, all participants from different countries who during 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 goes to H.M. King Carl XVI Gustaf and to Joacim Rosenlund, administrative secretary of the conference, colleagues from Lnu Malin Bolander and Anna Gustavsson and the Environmental Science and Engineering Research Group: Marcia Marques, Fabio Kaczala, Amit Bhatnagar, Eva Kumar, Henric Hansson, Henrik Svensson, Sawanya Laohaprapanon, Muhammad Assim, and in particular also 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.

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accumulated knowledge, including reuse and/or recycling of materials bound in urban and rural structures. This time many thanks were given to 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 making it possible to organise the workshop in Swedish “Remediation of Oskarshamn harbor – New knowledge and new possibilities”.

Since the conference 2014 the activities in ESEG has been more and more directed into “the Beyond the zero waste” activities and both research and several international PhD courses has been carried out. During one of the PhD courses in Glass mining, 17 nations were represented. The co-operation with Ragnsells, Glafo and Gothenburg Univeristy has increased in the area of Glass mining and Ragnsells is now sponsoring 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 activies have continued and then in particular in Sweden and Estonia. A new profile of landfill mining was entered in cooperation with Sydvatten for test excavations of landfilled drinking water sludge. An international PhD course was held on field sampling and extraction of Al and Fe from landfill drinking 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 cell for sorting of fine material fractions as in ash, sludge, bottom sedeiments and polluted soils for later recovery when economic methods for extraction of for instant metals and nutrients will exist. The cooperation with the floor manufacturer AB Gustaf Kähr is continued and very soon a Demo-plant for treatment of industrial process water and for upgrading of stromwater for industrial use will be implemented in the industry.

During 2016 Jelena Lundström continue to lead the administrative work as project assistant for the conference and the staff of the Environmental Science and Engineering Research Group: Fabio Kaczala, Joacim Rosenlund, Yahya Jani, Richard Mutafela, Juris Burlakovs, Charlotte Marchand, Marco Tadeu Gomes Vianna and also Ann-Christin Bayard at Linnaeus Unviersity as well as Jan Stenis, LundaHydro AB, have played an important role for the organisation of this 20 years Anniversery conference of Linnaeus Eco-tech. Many thanks go to Stina Alriksson editing the Book of abstracts and proceedings.

Phytoremediation projects in cooperation with the local waste management company KSRR were carried out and ended up in a doctoral thesis in beginning of 2017 by Charlotte Marchand. Another doctor degree thesis on the Triple concept was presented already in the beginning of 2017 by Joacim Rosendlund. The Orrefors Phytoremediation/tourist park was constructed with 12 000 visitors already the first summer. Co-operation increased with Jeanette Lennartsdotter, CEO at Orrefors Park, several international MSc/PhD courses were held in Orrefors, and the park was developed further. The international cooperation in the Baltic Sea region was strengthened as Ukraine and Georgia were more involved and Armenia participated.

Yahya Jani became double doctor and now with the thesis “Landfills and Glass Dumpsites as future bank accounts of resources – waste characterization and trace elements extraction” defended on 2 February 2018 at Lnu. Also 2018 Jelena Lundström took the lead of the hard

administrative och organisative work of Linnaeus Eco-tech 18 for the third time since 2014. Yahya was responsible for the editing work of the abstracts and the full papers. Furthermore, Ecobaltica XV-th International Youth Scientific and Environmental Forum of Baltic Region Countries will be held November 29 to December 1, 2018 in Copenhagen.

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)
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