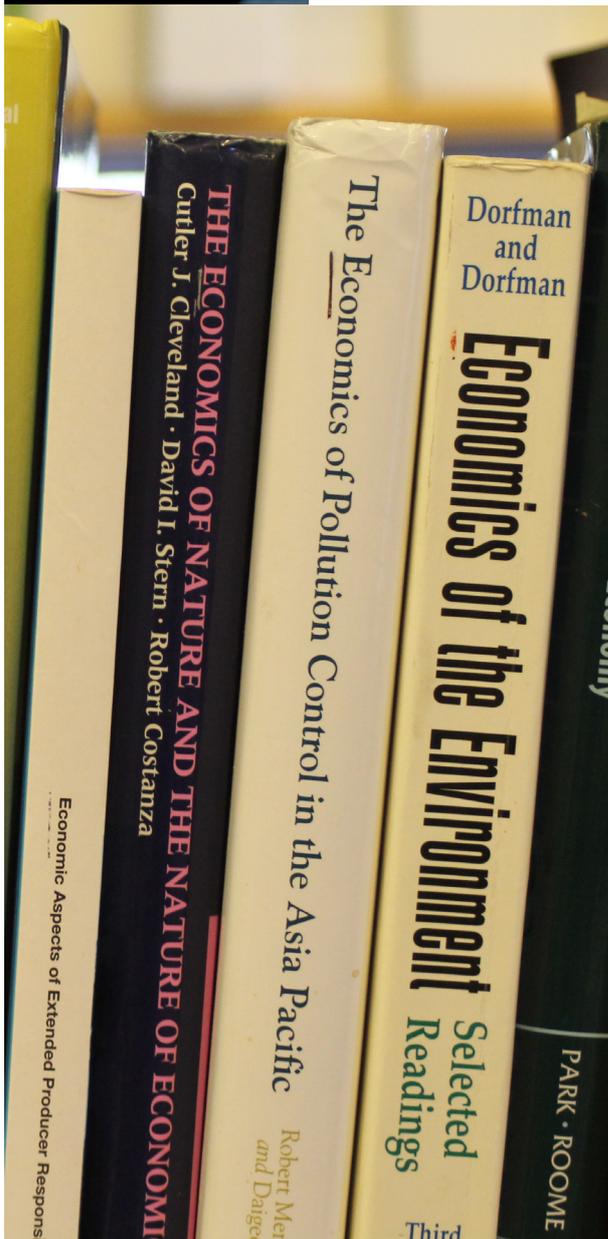




LUND
UNIVERSITY

Research Evaluation 2014

SELF EVALUATION | THE INTERNATIONAL INSTITUTE FOR INDUSTRIAL
ENVIRONMENTAL ECONOMICS – IIIIEE | LUND UNIVERSITY 2014



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1. Aim and Approach

In 2012, Lund University (LU) published a Strategic plan with the vision “A world-class university that works to understand, explain and improve our world and the human condition”. The overall goal of the university is to attain the highest quality in education, research, innovation and interaction with society. The goal shall be achieved through the following strategies:

- Cross-boundary collaboration
- Internationalisation
- Quality enhancement
- Leader, teacher and employee excellence

In April 2013, the vice Chancellor at LU decided that the Faculties and the Special Activities (USV) at LU should develop strategic plans for their research, and in June 2013, the Board of USV provided guidelines for this. The USV guidelines recommend the USV departments, including the IIIIEE – the International Institute for Industrial Environmental Economics – to develop research evaluations (self-evaluations) and to analyse/evaluate their research in terms of the four strategic areas introduced in the Strategic plan of LU.

The evaluation process at the IIIIEE was initiated in November 2013 and a staff meeting was held to discuss the proposed evaluation framework and to develop initial SWOT analyses. Throughout December and January, data were collected utilizing annual reports, surveys of research staff, interviews of research staff, administrative records about projects and funding, etc. In addition a bibliometric analysis of publications was performed. Initial results were presented to staff at a meeting in late January and further input was discussed. A draft of the evaluation report was sent to staff in the first week of February 2014 for comments.

As part of the evaluation process the IIIIEE invited two Critical Friends:

- Per Mickwitz, research director and professor at the Finnish Environment Institute (SYKE), Finland
- Susse Georg, professor at Aalborg University, Denmark

A draft of the evaluation report was sent for comments to the Critical Friends in February – the same report that was sent to the researchers at the IIIIEE. The Critical Friends and the researchers at the IIIIEE were invited to a workshop at the IIIIEE, March 6, to discuss the report. The result of the workshop and the comments provided by the Critical Friends were considered and incorporated in the final evaluation report.

The evaluation was coordinated by Lena Neij, Director at the IIIIEE, and Eva Heiskanen, guest professor at the IIIIEE, data were collected by Jessika Richter, project assistant, and all researchers at the IIIIEE provided data and comments to the report and participated in meetings, workshops and discussions. Guidelines for the evaluation on the societal impact were provided by Lena Neij, Oksana Mont and Eva Heiskanen.

The evaluation focuses on the years 2008-2013, but older data is also used for comparison.

The self-evaluation presented in this report is outlined as follows. Section 2 contains a short introduction to the IIIIEE research highlighting focus, excellence and originality, interaction with education, societal impact and communication. Section 3 contains a detailed analysis of some key indicators highlighting quality enhancement, cross-boundary collaboration, internationalisation and leader, teacher and employee excellence. The comments provided by the Critical friends are summarized in chapter 4, and the self-evaluation is finalized with a SWOT analysis of the IIIIEE research activities in section 5.

2. IIIEE – Advancing Strategies for Sustainable Solutions

The International Institute for Industrial Environmental Economics (IIIEE) is an international institute within Lund University that bridges academia and the wider society in order to meet sustainability challenges. Our education and research aim to influence the world and make a difference. The core mission of the Institute is to advance strategies for sustainable solutions. In contrast to the prevailing focus on problems, the Institute emphasises pathways to solutions. We explore and advance knowledge on the design, application and evaluation of policy and business strategies to meet global environmental challenges. We strive to advance strategies for sustainable solutions pursued by public authorities and businesses – internationally, nationally and locally.

Since its foundation in 1994, the IIIEE has engaged in environmental education and research. The Institute has approximately 20 senior researchers and 10 PhD candidates (see Appendix A) and operates two international Master's programmes, freestanding courses, PhD education, a wide range of research projects and numerous outreach initiatives. Our activities are truly interdisciplinary, collaborative and international.

Interdisciplinary. The IIIEE education and research has a unique and genuine interdisciplinary approach synthesizing insights not only from economic theory and practice but also from natural sciences, engineering, political science, organizational, legal and behavioral studies. Researchers and lecturers at the IIIEE have backgrounds in various disciplines and the IIIEE cooperates closely in education and research with researchers and universities worldwide. We believe that a true interdisciplinary approach is required to meet the sustainability challenges of today and tomorrow.

Collaboration. The IIIEE education and research is performed in close collaboration with business, authorities and other societal partners. We actively engage our partners via collaborative research projects, case study projects, lecture series, interactive seminars and workshops. We strive to create a bridge between academia and wider society in order to meet sustainability challenges.

International. The IIIEE education and research is performed in close collaboration with international researchers and partners (see Appendix B). The IIIEE Visiting Academy was founded in 2013 to strengthen cooperation with prominent academics and business leaders in the IIIEE educational programs and research activities. In 2014, 17 countries or origin were represented among the research staff at the Institute; diversity was further enriched by our guest professors and international Master's students.

2.1. IIIEE STRATEGIC PLAN 2014–2018

In 2013, the IIIEE developed "The IIIEE Strategic Plan 2014–2018". The Strategic work at the IIIEE started in 2010 and has been performed in dialogue with the IIIEE Board. The work has resulted in a Strategic Plan including the following vision and strategic areas.

Our Vision: The vision of the IIIEE is to be an international institute advancing strategies for sustainable solutions through cutting edge interdisciplinary research and high quality innovative education.

Strategic areas: The Strategic Plan guides the Institute's work towards the IIIEE vision in the following strategic areas:

- High quality innovative education
- Excellence and renewal in interdisciplinary research
- Effective communication and strong partnerships

For more information see:

- The IIIEE Strategic Plan 2014-2018
- High quality and innovative education - IIIEE strategic plan in education 2014-2018
- Excellence and renewal in interdisciplinary research education - IIIEE strategic plan in research 2014-2018
- Effective communication and strong partnerships - education - IIIEE strategic plan in communication 2014-2018

2.2 IIIEE RESEARCH

IIIIEE research addresses sustainability challenges and strives to improve resource efficiency, climate change mitigation, and support sustainable business. It has high policy and practical relevance.

The aim of IIIIEE research is to understand the design, implementation, success and failure of strategies towards sustainable solutions in businesses and public authorities around the world. For us, strategies are not formal or abstract plans, but are first and foremost concrete approaches and actions developed to support sustainability. Consequently, we:

- assess governance and management structures
- evaluate policy instruments and business models
- explore visions and scenarios

IIIIEE research originates from complex environmental challenges, which are by nature interdisciplinary. To engage with this complexity the IIIIEE has developed a unique research environment with a genuine interdisciplinary profile synthesizing insights from several disciplines. The research is problem-oriented and the research designs rely on multiple methodologies and research approaches.

Our research is developed and carried out in close collaboration with business, government and other societal partners. To ensure the vitality and relevance of the research, new research projects are formed in close interaction with stakeholders from society, in particular industry and government. IIIIEE researchers are also invited as experts in a number of international assignments, such as the IPCC.

The research at the IIIIEE started in 1994 with a focus on preventative approaches to environmental challenges. Today the scope and focus of the IIIIEE research is structured under the heading “*IIIIEE - Advancing strategies towards sustainable solutions*” and further developed around three themes:

- Strategies for sustainable consumption and lifestyles
- Strategies for sustainable cities and regions
- Strategies for low-carbon infrastructures and systems

These themes tackle sustainability challenges on three levels – the consumer and organizational level, the urban community level and the national/international system-wide level. The themes are described below with reference to excellence and scientific originality; a more detailed description of quality enhancement, cross-collaboration, internationalization and leadership is provided in chapter 3. The societal impact and research communication is described in section 2.4 and 2.5 below. The interaction between research and education is specifically addressed in section 2.3.

Strategies for sustainable consumption and lifestyles

Focus: Making sustainable living easier

Actors considered: Business, public authorities, consumers

In this research theme IIIIEE researchers:

- advance knowledge on barriers and drivers for more sustainable consumption and lifestyle
- analyse policy and management structures for sustainable products and services, and business models for green markets in supply chains and retail companies
- examine and develop strategies for waste prevention, reuse and recycling.

IIIIEE research framed under this theme started in 1994 and demonstrates excellence and originality in several research topics. For example, the IIIIEE has contributed to the formulation of seminal concepts in product-oriented environmental policy and management that have engendered a wide stream of subsequent research.

In year 2000, Thomas Lindhqvist, published his PhD thesis *Extended producer responsibility in cleaner production: Policy principle to promote environmental improvements of product systems*, a publication that has received approximately 260 citations (source Google Scholar). Extended producer responsibility (EPR) is still a key research area at the IIIIEE and publications have been translated into several languages. Various evaluation theories and

frameworks, such as the intervention theories, have been developed and applied to evaluate policy instruments for extended producer responsibility.

IIIEE is also well known for research in the area of product-services systems (PSS). In 2002 Oksana Mont published the highly cited article “Clarifying the concept of product–service system” in *Journal of Cleaner Production* (app 680 citations: source Google Scholar), and in 2004 her thesis *Product-service systems: panacea or myth?* was published (app 360 citations). The product-services systems (PSS) framework is shifting corporate focus from selling products to selling product-services. Policy packages and business models promoting *servicizing*, that is facilitating the shift from product to service based consumption models, have been analysed. The research further shows excellence and originality in topics such as innovative scenarios for sustainable lifestyles, collaborative consumption, emergent models of social innovation and peer-to-peer production-consumption constellations. In 2004, Oksana Mont published article “Institutionalisation of sustainable consumption patterns based on shared use” in *Ecological Economics* (app 120 citations). And in 2010, the paper “Socially responsible purchasing in the supply chain: drivers and barriers in Sweden” in *Social Responsibility Journal* by Oksana Mont and Charlotte Leire was selected as a Highly Commended Award Winner at the Literati Network Awards for Excellence.

The research on Strategies for sustainable consumption and lifestyles further covers topics such as the role of retailers in promoting sustainable consumption, sustainable supply chain management, environmental and sustainability standards and certifications systems, virtual meetings, sustainable tourism, etc.

IIIEE researchers have coordinated and participated in several national and international projects, see Appendix C. Researchers have also participated in high level assignments, such as:

- International expert in Task Force on “Sustainable Consumption and Green Development” of the China Council for International Cooperation on Environment and Development (CCICED), 2012-2013 – Oksana Mont
- Management Committee Member in the European Topic Centre on Sustainable consumption and production at the European Environmental Agency, 2009-2013. – Oksana Mont, Naoko Tojo
- Invited expert for UN organisations UNEP, UNDP, etc., 2007-2013 – Oksana Mont, Philip Peck, Naoko Tojo, Andrius Plepys

Since 2008, 8 PhD candidates have defended their thesis on topics related to strategies for sustainable consumption and lifestyles. (Going back to 1994, the number of PhD candidates is 24).

Strategies for sustainable cities and regions

Focus: Supporting a sustainable urban transition
Actors considered: Business, public authorities, (urban citizen)
In this research theme IIIEE researchers advance knowledge on governance models for sustainable urban areas and regions. We do not limit our research to traditional urban planning but also include tools like visions, collaborative dialogues, financing models, local regulations and public procurement for urban transition processes to design new governance strategies.

IIIEE research in this theme started in 2006 and build on experience from the two other research themes - Strategies for sustainable consumption and lifestyles and Strategies for low-carbon infrastructures and systems. Many of the earlier research projects have been framed in an international or national setting. But, the importance of the urban and regional political power is increasing as more and more people will live in cities. Moreover, many cities have more progressive sustainability and climate goals than national goals. Cities also compete and networks have been initiated to support sustainable city development and facilitate comparisons and learning. Over the years, the IIIEE has developed knowledge in several urban related topics, such as waste, energy, buildings, ICT etc. These, and many other topics will now be further developed in research on strategies for urban sustainability. Ongoing research specifically highlights various models for local (urban) governance such as urban governance experiments, urban living labs, local climate governance, polycentric governance, and urban ecological security. IIIEE researchers have contributed to knowledge development of energy efficiency in buildings conceptualizing and articulating transactions costs of energy efficiency investments, (local) learning process and the development and application of alternative methods for the evaluation of policy instruments. In particular, original work on local learning processes is ongoing, which will serve to demonstrate the economic and societal value created in the deployment process of new technologies, which occurs locally in cities and regions, but is critical for reducing the costs of new technologies.

The IIIIEE researchers coordinate and participate in several projects focusing on Strategies for sustainable cities and regions, see Appendix C. Moreover, IIIIEE is located in the Öresund region, one of the most dynamic regions in Europe, with the ambitions to become one of the most creative and sustainable city-regions in the world. This provide the IIEE with many local partners and a dynamic platform for education and research to advance sustainable solutions. Since 2011 the IIIIEE coordinated the Lund University Urban Arena including more than 160 researchers at LU performing research related to sustainable urban development.

Strategies for low-carbon infrastructures and systems

Focus: Supporting sustainable energy systems and ICT infrastructure. Actors considered: Business and public authorities

In this research theme IIIIEE researchers advance knowledge on policies, and organizational and physical structures needed to facilitate the transition towards a low-carbon economy. We design and evaluate policy instruments and business models supporting resource efficiency, renewable energy, green economy and sustainable business. IIIIEE research framed under this theme started in 1994 but it was not established as a key research area until 2001. The research demonstrates excellence and originality in several research topics. Since 2001, IIIIEE research has highlighted the importance of a transition towards a low-carbon economy and the need to increase energy efficiency and sources of renewable energy. Two key publications on this topic by Thomas B Johansson, among many, are *Energy for a sustainable world* (app 590 citations, (source Google Scholar) and *Renewable energy: sources for fuels and electricity* (app 525 citations, source Google Scholar). These publications were followed by many other well cited publications such as *World Energy Assessment: Overview: United Nations Development Programme of 2004* (app 120 citations, source Google Scholar). Over the years, strategies for energy efficiency and sources of renewable energy was then further developed.

A core topic within this research theme is the development and assessment of methods for analyzing the dynamics of energy systems in view of technical change, i.e. development, introduction, and diffusion of new technology, and policy measures and business models for effecting and accelerating technical change. Cost reduction and learning curves has been a key topic and Lena Neij has published a number highly cited article on this topic, see e.g. "Use of experience curves to analyse the prospects for diffusion and adoption of renewable energy technology" in *Energy policy*, (app 240 citations, source Google Scholar), "Cost development of future technologies for power generation—a study based on experience curves and complementary bottom-up assessments" in *Energy policy* (app 170 citations, source Google Scholar), and "Cost dynamics of wind power" in *Energy*, (app 150 citations, source Google Scholar). Ongoing research focus on learning effects related to the implementation of new energy technologies.

The IIIIEE researchers have contributed to the development and use of alternative evaluation methods of policy measures, such as the development of a multi-criteria evaluation framework for the evaluation of market based instruments as applied to energy efficiency, and the development of an evaluative framework based on outcome indicators. IIIIEE researchers have also developed, assessed and applied alternative energy-economy models, such as vintage models, which have been used for the development of scenarios and for the evaluation of policy instruments. Moreover, researchers have developed a novel regional econometric decomposition analysis. In 2008, the article "Markets for Energy Efficiency: Implications of an EU-wide tradable 'White Certificate' Scheme" (published in *Energy Economics*) by Luis Mundaca was awarded the Best Nordic Paper in Social Science by the Nordic Energy Research Council and the Nordic Energy Forum.

The IIIIEE researchers have applied social science to the design and development of the theories of bio- economy and articulated an important research gap in the existing literature on bioeconomy. IIIIEE researchers work to complement and enrich traditional engineering approaches with insights from sociological, management and strategic theory. In 2007, Kes McCormick co-authored the article "Biofuels for transport in Europe: Lessons from Germany and the UK" in *Energy Policy* (app 110 citations).

The research on Strategies for low-carbon infrastructures and systems is also spearheading work on energy security with the development of the concepts of "vital energy systems", the concept of "three perspectives on energy security" and the application of securitization theory to energy security. Moreover, IIIIEE researchers have contributed to the development of the concept life cycle thinking and resource (energy) efficiency and its application in environmental policy.

IIIIEE researchers have coordinated and participated in several national and international projects, see Appendix

C. Researches have also participation in high level assignments, such as:

- Lead Author (Chapter 3), Contributing Author (Chapter 15), and Policy Evaluation Coordinator on the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). 2011- Luis Mundaca
- Member of Executive Committee, Convening and Lead authors for the Global Energy Assessment, 2007-2012 – Thomas B Johansson, Aleh Cherp, Lena Neij, Luis Mundaca, Lars Strupeit, Bernadett Kiss
- Advisors and evaluators of the EU Commission on the 'Strategic Energy Technology' (SET) Plan Integrated Roadmap. Lena Neij, Aleh Cherp, Luis Mundaca
- Board Member: World Bioenergy Association 2011-2014, Philip Peck
- Invited expert for several IEA Tasks – Lena Neij, Luis Mundaca

Since 2008 (2007), 4 PhD candidates have defended their thesis on topics related to strategies for low-carbon infrastructures and systems.

2.3 IIIEE EDUCATION

In 1995, the IIIEE launched its Master's programme in Environmental Policy and Management (EMP) to educate professionals committed to and capable of solving global sustainability challenges. More than 600 graduates of the programme from 85 nations are now contributing to sustainable development in industry, government, UN, NGOs, and academia. In 2005, the IIIEE led a consortium to launch the Erasmus Mundus Masters Programme in Environmental Sciences, Policy and Management (MESPOM). MESPOM is now delivered in cooperation with 3 European and 2 North American universities, enabling the students to study different aspects of sustainability in different cultural and academic contexts.

The hallmarks of the IIIEE's education are academic excellence, interdisciplinarity, teaching innovation, unparalleled attention to individual students, and close engagement with real-life practice in the private and public sectors. Today more than 50 companies and organisations are connected to our educational activities. The international character of our programmes and our Alumni Network have supported intense learning across national boundaries. Every second year, the IIIEE supports the organisation of an alumni conference where students and researchers can interact with former students.

Close links between education and research, combined with innovative pedagogy ensure academic renewal and create new ways of interacting with the world around us. A prerequisite for effective learning is the opportunity to interact with teachers/researchers who contribute to new knowledge through their research. The Institute is committed to grounding our education in research and tying our research to attractive educational programmes. We specifically would like to highlight the Strategic Environmental Development (SED) course which involves teams of students paired with a senior researcher applying IIIEE research in the field with small projects with municipalities and businesses. The results of these projects are published by the IIIEE each year. Additionally, each year over 30 master students spend 4 months each in writing master theses on highly relevant topics often developed in close collaboration to IIIEE researchers and in collaboration with business and other societal partners. Interaction with international researchers is enhanced through our Visiting Academy of prominent academics and business leaders actively engaged in the IIIEE educational programs and research activities.

The IIIEE also holds a Unesco Chair in education for sustainable development. One key product of the Chair, is the development of the web based Young Masters Programme (YMP). The programme started in the mid-1990s, and in 2011 a new powerful platform of the YMP was launched in cooperation with UNESCO. So far, approximately 20,000 students from 113 countries have participated in the educational programme. Today the YMP is run by the YMP-foundation. As of 2014, the IIIEE is to further develop our web based educational activities and we are now to launch a MOOC on the topic Greening of the economy: lessons and experience from Scandinavia. The open web-based educational activities provide an important outreach channel of the research at the IIIEE.

The IIIEE also provides PhD education that is focused on building competence in interdisciplinary research on topics related to Advancing strategies for sustainable solutions. To strengthen an interdisciplinary PhD learning environment a "PhD article incubator" was launched in 2013. Here PhD students discuss interdisciplinary research, research relevance and quality and how to publish research as journal articles. The IIIEE also runs interdisciplinary PhD courses; recent examples include a course on Policy Evaluation (2012) and another on "Interdisciplinary Research: Making a contribution" (2013). Since 2010 weekly research seminars are organised at the IIIEE where

researchers and PhD students present their research. The IIEE PhD education is developed in close collaboration with the IIIIEE research, and PhD students participate intensively in the research projects at the IIIIEE. The IIIIEE PhD students are employed by academy, business, authorities or other societal partners (see section 3).

2.4 IIIIEE RESEARCH –SOCIETAL IMPACT

In this chapter we will highlight the societal impact of the IIIIEE research. Although we see the societal impact as an essential result of our research we have not until now developed or applied tools to evaluate the societal impact of our research. We just recently realised this and as part of this evaluation we decided to review literature on the area and to develop a framework for evaluating our research, see Appendix D. The assessment of our societal impact described below is to be seen as a first attempt and we have already decided to develop more detailed cases describing the process of societal impact. These will be developed later this year.

Project collaboration

In 2013, the IIIIEE hosted more than 30 research projects, all of them externally funded. Among these were 7 projects co-financed by business and other societal partners and another 6 projects were performed in close collaboration with business and government partners although fully financed by governmental funding agencies. The research was presented in papers published in academic journals, book chapters and reports, some of these were co-authored with business and other societal partners.

Public policy

IIIIEE researchers actively participate in public policy processes and are often invited to talk at workshops organized by government representatives, such as the European Parliament, the European Commission DG Enterprise and Industry, the European Commission DG Energy, the IEA, UNESCO and UNEP. IIIIEE researchers are often involved in contracted research for government, below are selected examples of such contracted research projects between 2007 and 2013.

- “The producer responsibility principle of Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)” commissioned by the EU DG Environment (2007)
- “Methods for evaluating climate policy instruments”, commissioned by the Swedish EPA (2007)
- “Barriers to, and policy instruments for, a more efficient energy use” , commissioned by the Swedish Government (2007)
- Consortium member of European Topic Centre for Sustainable Consumption and Production (2009-13)
- “The importance of transaction costs– a review addressing transaction and adjustment costs of mitigating climate change”, commissioned by the World Bank (2011)
- “Material Recycling without Hazardous Substances – Experiences and future outlook of ten manufacturers of consumer products” commissioned by Swedish Chemical Inspectorate (2012)
- A background report on the experiences of green public procurement and public procurement of innovation, for the Swedish Public Procurement Committee (2013)
- A number of projects commissioned by Nordic Council of Ministers (e.g. waste prevention of textiles, waste prevention indicators and targets for waste streams, WEEE, reuse, and consumption) (2007-2013)

IIIIEE researchers are involved in committees or advisory bodies to governments and international organizations and IIIIEE researchers have been commissioned by the European Commission to be part of the development and evaluation of the Integrated Road Map of the SET Plan. Moreover, IIIIEE researchers are members of funding agency committees such as the Swedish Research Council, the Swedish Energy Agency, KK-stiftelse (funding organizations for new universities) and the Waste Council (Avfallsrådet) at Swedish EPA.

IIIIEE research has been used (and referenced) in governmental/organizational investigations and the research has influenced the design process of new policy instruments, legislation or political decisions. For example, IIIIEE research has been used in the design of extended producer responsibility (EPR) policies in numerous countries including Sweden, Canada, Lithuania, Belarus, India, Argentina, Thailand, etc.. Our research has also contributed to the discussion of various design of tradable certificate schemes for energy efficiency improvements in the EU and the Pollutant Release and Transfer Registration (PRTR) In China. Moreover, IIIIEE Research has informed and influenced the use of virtual meetings by authorities in Sweden.

IIIIEE researchers are also involved in collaborative projects with local government, e.g. the through the Innovation Platforms for sustainable urban development in Malmö and Lund, a number of INTREREG research projects on

sustainable urban development, the development of Miljöbyggprogram Syd, and the evaluation of sustainable construction in Lomma. IIIIEE researchers have been active in the projects and the researchers have come to support the process and output of the projects.

Business and Innovation

Beyond being used by policy-makers and organizations, IIIIEE's research has been designed to influence business and innovation. IIIIEE research assists industry actors in providing solutions with less environmental burden. The policy research, as described above, is often performed in cooperation with business (see section 3). IIIIEE researchers are invited to talk at seminars and workshops organized by business representatives. Researchers are also members of working groups with business representatives (e.g. the individual producer responsibility – IPR-working group, etc.).

IIIIEE research is cited and found useful to industry (e.g. the report "Myth to Realities" is often referenced by industry and the work resulted in update of Swedish quality objectives). IIIIEE research has also been used to design or commercialize new businesses or business models, e.g. a shift to functional sales at AGA and the re-design of food serving at IKEA.

2.5 IIIIEE - RESEARCH COMMUNICATION

The IIIIEE's communication has been identified as an area for improvement in the past. To support communication, it was decided in 2011 to have a full-time communication coordinator at the IIIIEE.

Our ambition is to form a creative research environment. Today we:

- report activities and news on the IIIIEE's website
- provide weekly research seminars to support constructive dialogues and innovative research
- have developed a PhD guide in cooperation with the PhD students
- have developed a PhD article incubator to support the PhD students in writing and developing interdisciplinary research
- have developed more structured ways of discussing and developing new research proposals
- arrange workshops on an annual basis to discuss and develop the research and the research focus of the IIIIEE

Future ambitions and goals have been described in the IIIIEE Strategic Plan on Communication 2014-2018.

We receive attention from newspapers and popular publications. Some recent examples of this include:

- December 19, 2013. Oksana Mont's research referred to in an article on myths about sustainable consumption. <http://www.extrakt.se/livsstil-och-konsumtion/tio-myter-om-hallbar-konsumtion-som-leder-beslutsfattare-fel/>
- December 17, 2013. Oksana Mont quoted about sustainable consumption and her report for the Nordic Council of Ministers. <http://www.nyhetsrummet.se/nyhet/35134/-politiker-maste-ta-ansvar-for-var-konsumtion/>
- December 13, 2013. Aleh Cherp's essay on energy security and climate goals in Europe appears in The Economist as part of a series managed by the Economist Intelligence Unit for Chevron.
- December 12, 2013. Carl Dalhammar writes a joint answer on the debate pages in Dagens Nyheter, regarding green public procurement.
- December 2, 2013. Bernadett Kiss' PhD research referred to in an article on the opinion's pages in Sydsvenskan.
- November 29, 2013. Bernadett Kiss invited to post on how to reach energy efficiency in the building sector on a forum for decision-makers on energy efficiency (<http://www.eneff-forum.se/>).
- November 25, 2013. Lena Neij quoted in an article on Sustainable urban development in Sydsvenskan.
- November 22, 2013. Oksana Mont featured in a press release about meeting about sustainable consumption myths organized by the Nordic Council of Ministers in Stockholm. http://www.mynewsdesk.com/se/norden_i_fokus/pressreleases/dags-att-oeverge-myter-om-haallbar-konsumtion-931550
- November 14, 2013. Mikael Backman featured in an article about a biogas conference held in Ystad arranged and organized by the Swedish Polish Sustainable Energy Platform in Skånska Dagbladet.
- November 12, 2013. IIIIEE graduate Saemundur Karl Finnbogason's MSc thesis featured in an article published in the eBay Main Street website, a grassroots community of advocates interested in how public policy impacts commerce.
- November 7, 2013. Oksana Mont was interviewed by Vetenskapsradion for the radio programme KLOTET.
- November 6, 2013. Matthias Lehner, PhD student at the IIIIEE, interviewed by City Lund about his view on consumption during Christmas times.
- October 7, 2013. Oksana Mont is quoted in an article about second hand, vintage clothes and sustainability published in Sydsvenskan.

- August 26, 2013. Luis Mundaca, Associate Professor at the IIIIE was interviewed by French Terra Eco News about carbon tax in Sweden.
- July 1-6, 2013. Oksana Mont participates in the debate at Almedalen Visby <http://www.svanen.se/Om-Svanen/Press/Pressmeddelanden/?newsID=3330>
- June, 2013. Oksana Mont featured in Norden's article on the "10 Myths of Sustainable Consumption" based on her research for the report on the subject for Nordic Council of Ministers. <http://www.norden.org/da/nordmiljoe/temanummer/2013/nordmiljoe-nordisk-policy-vinner-paa-att-oeverge-10-myter-om-haallbar-konsumtion>
- February 28, 2013, Peter Arnfalk discusses the pros and cons of telework in an opinion piece for the New York Times.
- External communication in the form of publications and research activities like conferences, seminars, and other activities will be presented in Section 3. In addition to these, the IIIIE supports the organisation of a biennial Network Conference for alumni of Master Programmes run by the IIIIE. Around 120 people, including IIIIE researchers, from more than 25 countries and diverse academic and professional backgrounds participate in the event. On each occasion, an overarching theme is set, and thematic workshops are organized, often related to research themes at the IIIIE.

3. Analysis of Key Indicators

3.1 QUALITY ENHANCEMENT

The substantive contribution and qualitative aspects of research quality have already been presented in describing the originality, vitality, and the importance of research at the IIIIE in Section 2 of this evaluation. In this section, quantitative aspects of IIIIE research in terms of inputs and outputs are first examined, followed by indicators measuring the scientific productivity, impact and prominence of the research and researchers at the IIIIE.

Research inputs: staff and funding

In 2012 there were 31 academic staff members employed at the IIIIE. Academic staff generally spend time on both research and education and some staff members do not work full time. Estimating the time spent only on research results in a full time equivalent (FTE) of approximately 12,5 research staff in 2012. The change in full time equivalent (FTE) research staff is shown for the reference years of 2002, 2007, and 2012, see Figure 1.

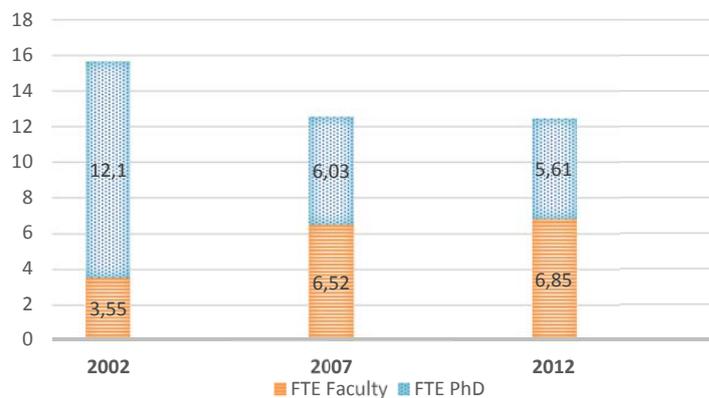


Figure 1. Full time equivalent (FTE) Senior and PhD Researchers 2002, 2007, 2012.

In the early 2000s most of the research was internally funded. By contrast, research at the IIIIE now relies on external funding. This has meant that researchers have not only been devoted to research and writing articles and reports, but also in writing proposals to for funding of the research. In 2013, the total research budget was 22 MSEK and approximately 75% was provided by external funders. Funding for research projects comes from a variety of sources, most notably the EU, FORMAS, and the Swedish Energy Agency (see Figure 2).

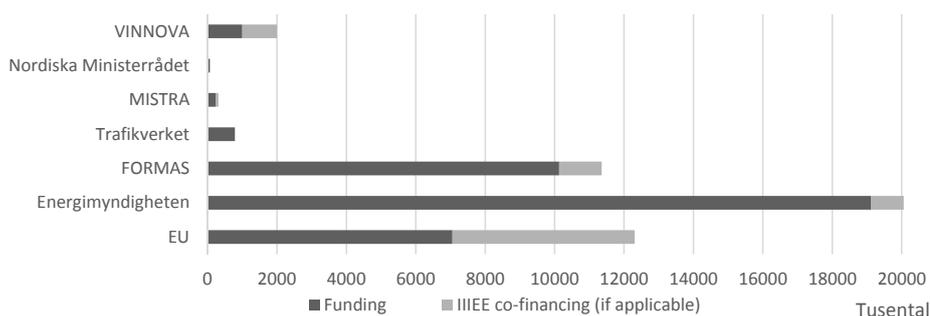


Figure 2. Funding of research projects by funding agency (December 2013).

Research outputs: publications and activities

One measure of the outputs of IIIIE research is scientific publications and other forms of communication within the scientific community. The output of publications by type as well as the total publication for 2002-2013 are shown in Figures 3. It can be noted that publication output and productivity change from year to year in response to different types of projects and the maturity of PhDs in their research. For example, a peak in 2005 can be observed as the result of a special issue of the Journal of Cleaner Production celebrating 10 years of the IIIIE, which showcased articles written by IIIIE researchers. The output of the IIIIE has traditionally been higher in the number of reports rather than academic journal articles, but the increased focus in the last couple of years on academic journal articles can be observed, especially in 2013.

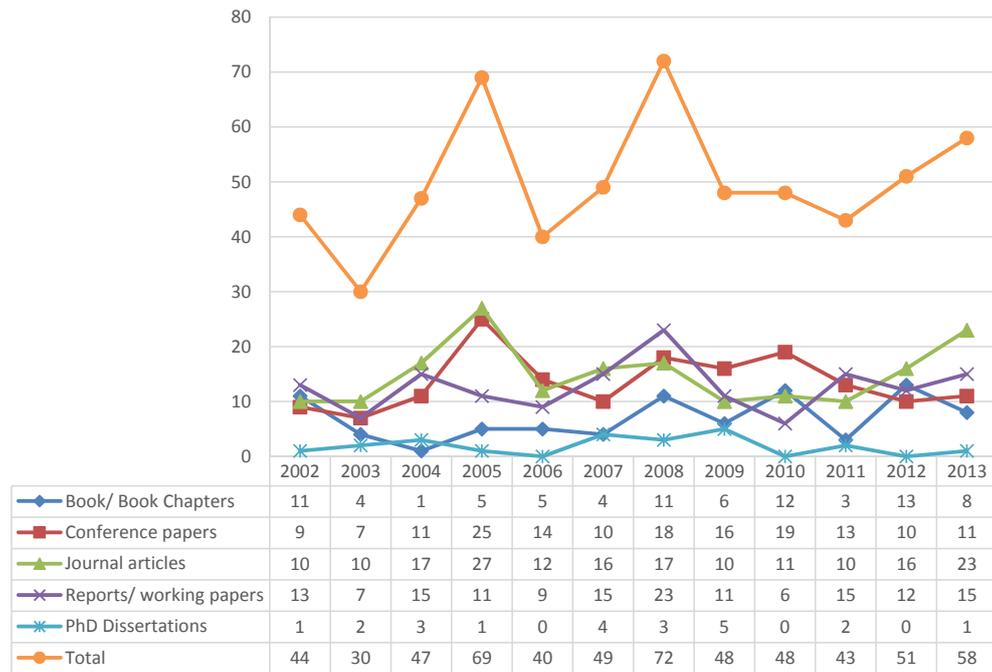


Figure 3. Publication output by type and year.

Beyond publications, the outputs of research also include activities that engage researchers in the scientific community. An overview of these activities is presented in Table 1 below. The time period 2002-2007 is compared with 2008-2013. In some cases, noted with 'NA' the information was not available or not collected in the same manner in earlier years to make a comparison. As Table 1 demonstrates, researchers from IIIIEE are regularly participating in international workshops and conferences and frequently also organizing or coordinating such events. Researchers are often invited to international conferences and workshops, and act as reviewers for international journals.

Table 1 Engagement in the Scientific Society.

	Total number 2002-2007	Total number 2008-2013
Invited lectures at international conferences	213	248
Plenary or Keynote lectures (subset of above)	80	62
Invitations to organize/chair sessions at international conferences	NA	23
Assignments to research councils or foundations of national or international significance (assignments >1 yr)	26	27
Assignments as evaluations for PhDs, lectureships and professorships	22	48
Assignment as editor or member of editorial boards of national or international journals	NA	12

IIIIEE PhD education has also resulted in 23 PhDs. Nevertheless, the number of students has decreased over the years. Since 2001, employing new PhD students have required external funding and due to this the Institute's strategy has been to reduce the number of PhD students to about 10. Since PhD students enrolled at Swedish universities must have a guaranteed financing for the whole period of PhD studies (4 years), the process of appointing new PhD students in relevant research depends on the success of acquiring long-term research contracts with external funding agencies (the IIIIEE requires external funding for at least 2 years to accept new PhD students). The challenge for the future is to sustain the size of the PhD programme.

While the number of PhD students has declined at the IIIIEE, the number of young researchers (post docs, research assistants and assistant lecturers) has increased. There were no young researchers at the IIIIEE in 2001, in 2007 there was 1, and in 2012 there were 5.

Scientific Productivity

One way to illustrate productivity is by measuring the publications per researcher. In presenting the productivity of research at the IIIIEE, the output of publications were divided by the inputs of full time equivalent (FTE) researchers. In 2012, the total productivity was 3,4 publications per FTE researcher and 1,3 journal articles per FTE researcher. In 2013 total productivity per was 4,3 with 1,7 journal article per FTE researcher. Productivity by type of publication for the years 2002-2013 can be seen in Figure 4. Again, it can be noted that publication output and productivity change from year to year in response to different types of projects, maturity of PhDs in their research special editions of journals, and increased focus on academic journal article writing in the last few years.

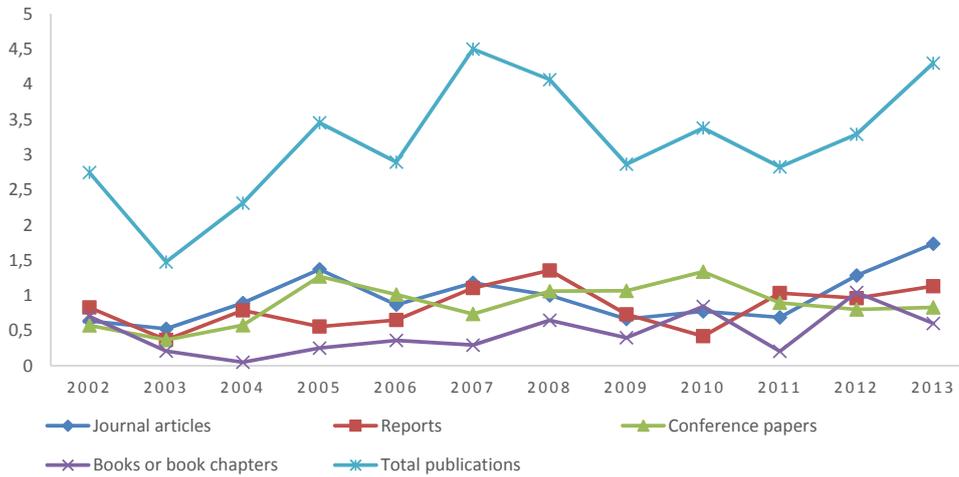


Figure 4. Productivity by full time equivalent researcher and by publication type.

Impact and Prominence

The quality of research also relates to the impact and prominence of the scientific papers published. The impact factor of journals where IIIIEE researchers regularly publish was used as an indicator of impact in a previous evaluation of IIIIEE research. It was found from 2002-2008 that the average impact factor of the journals IIIIEE researchers published was consistently between 0.8 and 1.5. This number was considered somewhat low partly because the environmental policy research field and journals publishing in this area were relatively new. In addition, many journals in the area of environmental policy research did not have an impact factor before 2008 (which was indicative of this being a relatively new and emerging field of research). Since then, the journals in which the IIIIEE publishes have had an increasingly large impact as indicated by their impact factors shown in Figure 5. The impact factor of several journals in which IIIIEE researchers have published has steadily risen in the past 5 years.

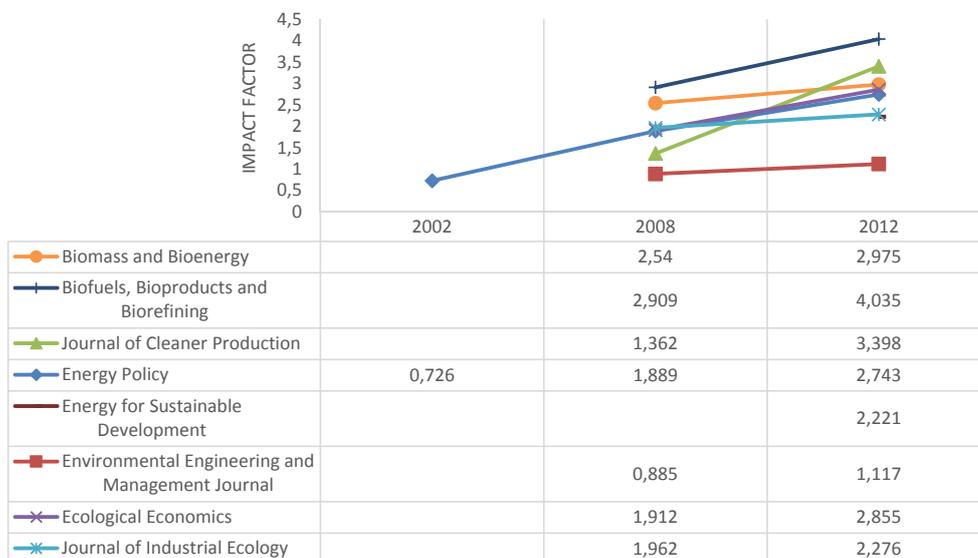


Figure 5. Impact factor of selected journals where IIIIEE researchers have regularly published.

Not only are the journals and research field itself advancing in prominence and impact, but IIIIE researchers are increasingly publishing in journals with higher impact factors, as well. The impact factor of journals where IIIIE published was an area that had previously been identified for improvement as the IIIIE matured as an organization and in its research. The table below shows the average journal impact for the given year. Again, it should be noted that 2005 celebrated the 10 year anniversary of the IIIIE with a special edition of the Journal of Cleaner Production featuring its research work. In contrast to Figure 4, the table below has normalized the impact factors to the latest available impact factor for a particular journal (so the 2005 Journal of Cleaner Production articles reflect the journal's 2012 impact factor (JIF)), which is significantly higher than in the past). It can be seen from the table below that even when this is taken into account, the mean journal impact factor for 2013 is the highest in the years considered, reflecting the work of IIIIE being published in journals with increasingly high impact factors.

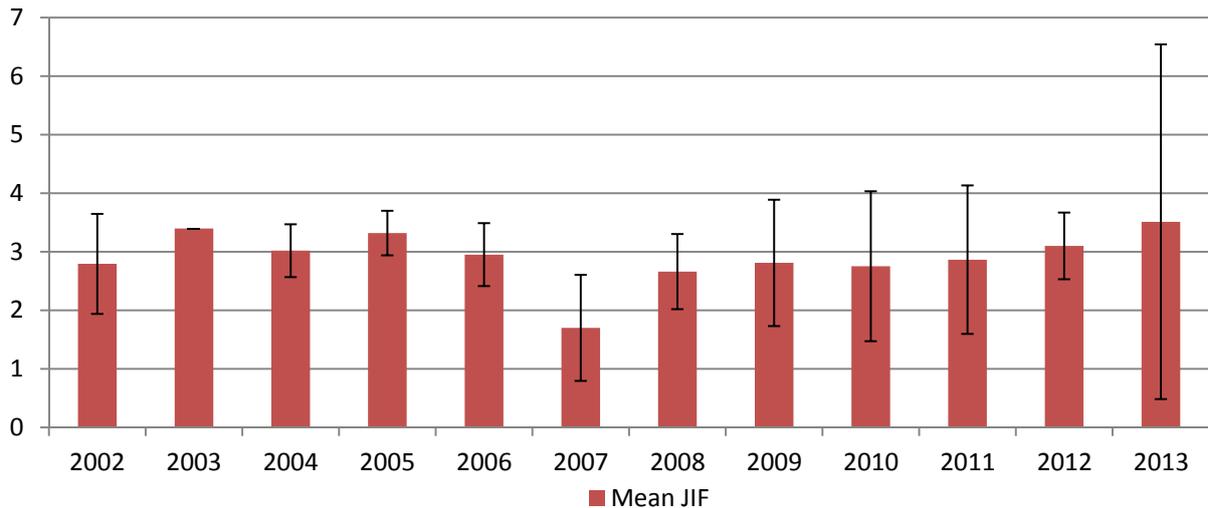


Figure 6. Journal impact factors (JIF) 2002-2013. Error bars show standard deviations for mean JIF in each year. A single outlier – Nature Climate Change, with an impact factor of 14,5 - highly influences the mean for 2013.

The impact of IIIIE research can also be measured in part by citations. In order to determine the development in terms of citations, two periods are studied, 2002-2005 and 2007-2011. To make the periods comparable, the citations are measured using a fixed 7 year citation window for both periods. For the 2002-2006 period citations are measured up until 2007 and for the 2007-2011 period citations are measured up until 2013. The results show that there is a rise in the average number of citations per paper during the period from an average of 3,7 for the first period to 13,4 in the latter.

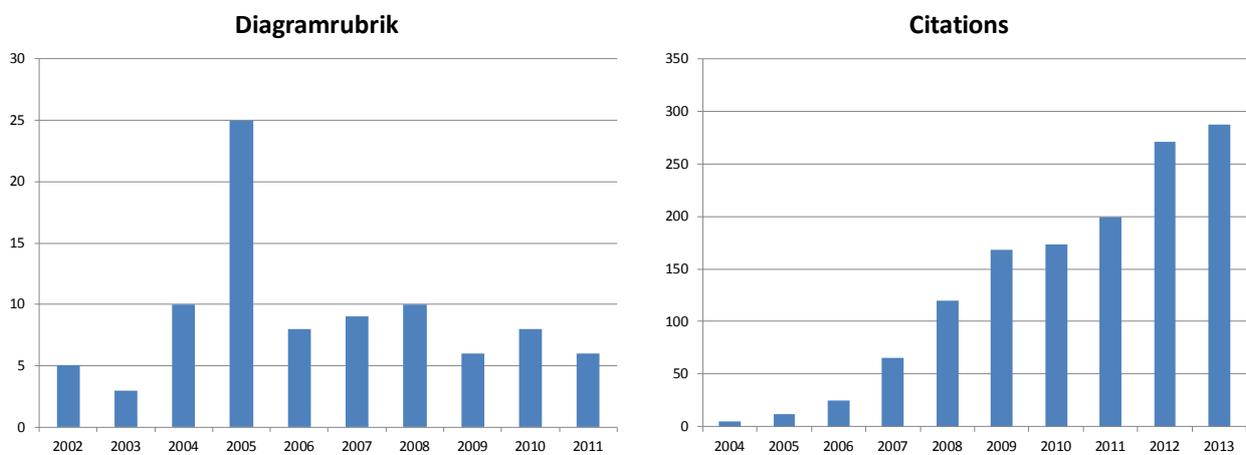


Figure 7. Number published and citations of papers from Web of Science (2014-01-24), two periods are studied, 2002-2005 and 2007-2011.

Using more advanced indicators it is possible to see the citation rates for the papers from IIIIE compared to the citation rates for the average publications in the particular journals in which the IIIIE papers have published (more about the methodology for this is part of Appendix E). IIIIE papers have been cited less than the average publication for the journal set in the first period (0,77). In the second period the citation rate has increased and is almost at the same level as the average for the journal set.

The impact of individual researchers can be measured to some degree by individual H values. The H values of research faculty at the IIIIE were calculated in Scopus (for more about methodology, please see Appendix E) over time. As the figure below demonstrates, the individual H values and the average H value have increased from 2002 to 2013. It is important to note that the Scopus database only includes publications from 1996 onwards and thus does not reflect work of researchers before the establishment of the IIIIE. Also, the Scopus database does not include reports and other publications, some of which have been cited extensively, and thus the H values do not reflect the entirety of the impact of IIIIE's research. The Google Scholar database captures a wider scope of IIIIE's research and this is reflected in the higher H values. Google Scholar includes citations for Swedish publications as well as well-cited reports – both of which may not be captured in the Scopus database.

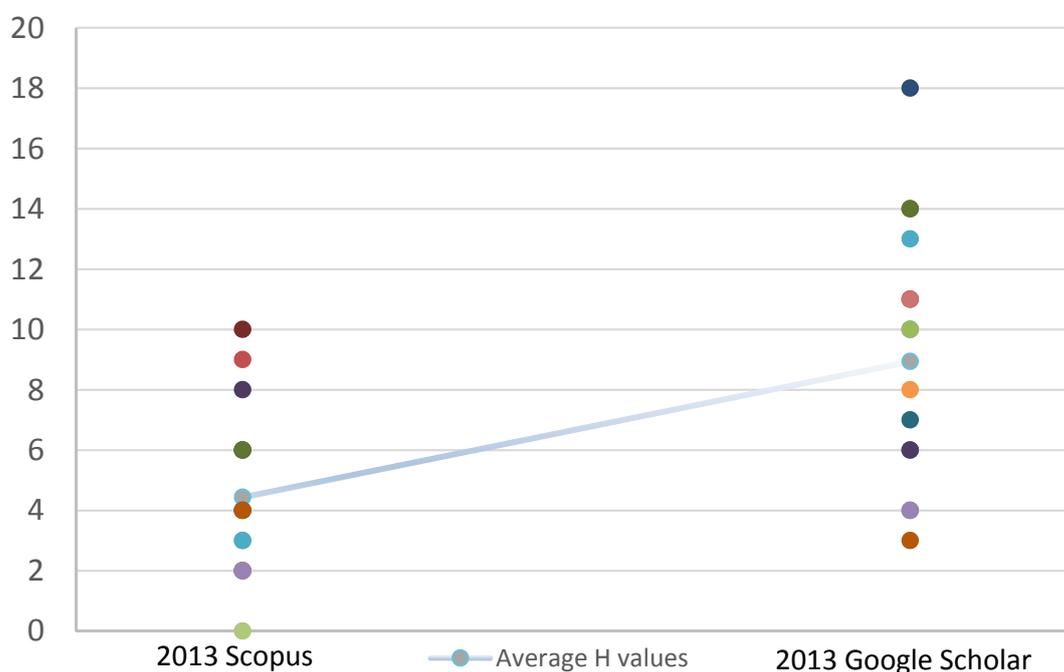


Figure 8. H-values using Scopus and Google Scholar 2013.

IIIIE researchers also have a significant impact through their participation in a number of high level assignments. Some examples of these include:

- UNESCO Chair in “Sustainable Development, Environmental Policies, Energy and Cleaner Production” – 2010 - Lena Neij
- Member of The Royal Swedish Academy of Engineering Sciences, IVA, 2009-, Lena Neij
- Member of Energiutvecklingsnämnden (EUN), Decision board for research funded by the Swedish Energy Agency, 2005- , Lena Neij
- Member of Executive Committee, Convening and Lead authors for the Global Energy Assessment, 2007-2012 – Thomas B Johansson, Aleh Cherp, Lena Neij, Luis Mundaca, Lars Strupeit, Bernadett Kiss
- Rapporteur to Scientific Advisory Group on Environment and Climate Change to the EU FP7 programme, 2009-2011 – Aleh Cherp
- Advisor to the EU Commission on the ‘Strategic Energy Technology’ (SET) Plan Integrated Roadmap. Lena Neij, Aleh Cherp, Luis Mundaca
- Lead Author (Chapter 3), Contributing Author (Chapter 15), and Policy Evaluation Coordinator on the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). 2011- Luis Mundaca
- Advisor to the Research Council of Norway on energy and climate change policy evaluation, 2009/2010 and 2014 – Luis Mundaca

- Advisor to the European University Association (EUA) and EU Commission on the development of the Integrated Road Map of the SET Plan (2013 – to present) – Luis Mundaca
- Advisor to the European University Association (EUA) on the Energy Education and Training Initiative within the EU-SET Plan, 2012/2013 – Luis Mundaca
- Member of the Executive Committee, Association for the Promotion and Development of Joint International Programmes in Higher Education, 2013 – Aleh Cherp
- International expert in Task Force on “Sustainable Consumption and Green Development” of the China Council for International Cooperation on Environment and Development (CCICED), 2012-2013 – Oksana Mont
- Management Committee Member in the European Topic Centre on Sustainable consumption and production at the European Environmental Agency, 2009-2013. – Oksana Mont, Naoko Tojo
- Invited expert for “Energy savings in practice: the role of the EU Ecodesign Directive” European Parliament, Brussels, 2013– Carl Dalhammar
- Resilient Post-Carbon Futures: The potential for rapid systemic transformation from community engagement and visions at a local, precinct or city level (Advisory Committee Member), Melbourne University, 2012-2013 – Kes McCormick
- Swedish Knowledge Centre for Renewable Fuels (F3 Centre) (Assistant Coordinator), Lund University, Swedish Energy Agency, 2011- current – Kes McCormick
- Member of the Joint Expert international steering group for the UNECE secretariats of the Convention on the Transboundary Effects of Industrial Accidents and of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes in 2007 – Philip Peck
- Lund University Biofuels (LU Biofuels) (Board Member), Lund University, 2008-current – Kes McCormick
- Invited expert for UN organisations UNEP, UNDP, etc., 2007-2013 – Philip Peck, Naoko Tojo, Andrius Plepys
- Board Member: World Bioenergy Association 2011-2014, Philip Peck
- Invited expert for the IEA Task on Industrial Productivity and Competitiveness, 2014 – Luis Mundaca

IIIEE researchers have an impact as editors and reviewers for academic journal. IIIEE researchers are members of editorial boards in the following journals:

- *Environmental Impact Assessment Review*
- *Environmental Engineering and Management*
- *International Journal of Energy Technology and Policy*
- *International Journal of Sustainable Society*
- *Journal of Remanufacturing*
- *Sustainability Journal*
- *Climate and Development Journal*
- *Energy Science & Engineering*
- *Journal for Industrial Ecology*

IIIEE researchers have been guest editors for special issues of international peer-reviewed journals such as:

- *Journal of Cleaner Production, special issue of on Urban Sustainability (2013)*
- *Journal of Industrial Ecology, special issue on Extended Producer Responsibility (2013)*
- *Journal of Cleaner Production, special issue on Sustainable Consumption and Production (2013)*

IIIEE researchers have been also very active as referees for a number of international peer-reviewed journals, such as: Ecological Economics, Energy – The International Journal, Energy Economics, Energy Policy, Environmental and Resource Economics, Environmental Engineering and Management Journal, The Journal of Energy, Carbon Management Journal, Economics of Energy & Environmental Policy, International Journal of Product Development, Journal of Industrial Ecology, Environment, Development and Sustainability, Waste Management Research, Journal of Cleaner Production, Sustainability, Sustainable Cities and Society, Science as Culture, Biofuels, Bioproducts and Biorefining (BIOFPR), Natural Resources Forum, Environmental Politics, Management of Environmental Quality, Clean Technology and Environmental Policy, Environmental Science & Technology, International Journal of Operations & Production Management, International Journal of Product Development, International Journal of Sustainable Society, Journal of Consumer Policy, Journal of Industrial Ecology, Journal of Material Cycles and Waste Management, Sustainability: Science, Practice, & Policy, Technovation: The International Journal of Technological Innovation, Entrepreneurship and Technology Management, United Nations Sustainable Development Journal. Lastly, the quality of IIIEE research is also evidenced by awards recognizing it. Below are a few examples of awards recognizing the quality of IIIEE research.

- Best Nordic Paper in Social Science award given by the Nordic Energy Research Council and the Nordic Energy Forum awarded in 2008 to Luis Mundaca
- Paper in Social Responsibility Journal has been chosen as a Highly Commended Award Winner at the Literati Network Awards for Excellence in 2010 to Oksana Mont and Charlotte Leire
- Best Paper at Renewable Energy World Conference & Expo North America 2013 to Tareq Emtairah, Brit Samborsky, Nurzat Myrsalieva

3.2. CROSS-BOUNDARY COLLABORATION

The research faculty and staff at the IIIIEE are trained in a variety of academic disciplines, see Figure 1. In addition, many of the researchers have a Masters and/or a doctoral degrees that are environmental in focus and interdisciplinary, demonstrating academic experience working with multiple disciplinary approaches themselves and a deep understanding of the interdisciplinarity inherent in the environmental policy research field. The close interaction between researchers with different disciplinary backgrounds, and between senior researchers and PhD students, promotes continued development of IIIIEE's contribution.

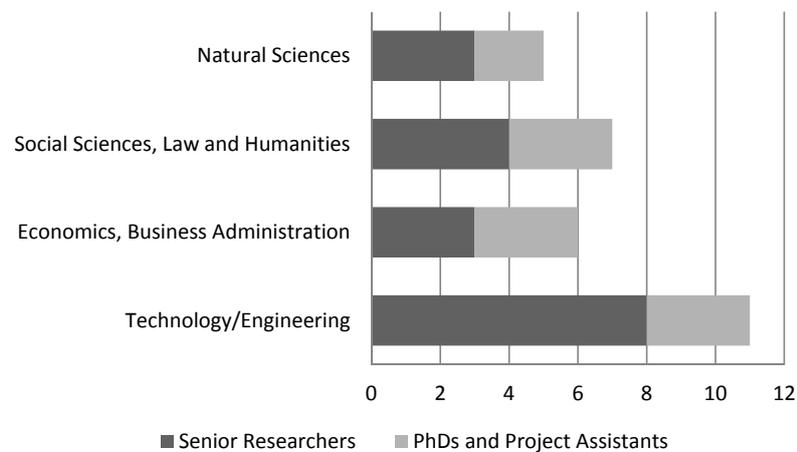


Figure 9. IIIIEE researchers academic background (Master's and Bachelor's degrees only).

Research at the IIIIEE is organised to encourage collaboration amongst IIIIEE researchers, to combine diverse competencies and to incorporate activities that address topical challenges and new approaches. Many researchers are active in more than one project and research theme. This results in research projects that could all be considered interdisciplinary in terms of the scope and approaches used. In 2013, the IIIIEE hosted 16 interdisciplinary research projects, i.e. projects that involve collaboration of researchers from different disciplines, including those within the IIIIEE, within Lund University, and researchers from other universities.

The IIIIEE is currently collaborating within other departments at Lund University in a number of areas. The Institute develops and participates in partnerships where cooperation brings added value to the Institute's activities and strengthens the Institute's strategic areas. For example, in 2012 IIIIEE researchers participated in the following research projects with partners from other units within the University of Lund: The Generational Goal - Changes of Consumption Patterns and Their Environmental Impacts (2012), an Pufendorf initiatives at LU financed by LU ; Solar Cities (2010-2013) financed by Formas and others; LETS 2020 (2009-2014) funded by the Environmental Protection Agency et al: the Renewable Energy Directive and Sustainability Criteria - Sweden in an European and Global context ", financed by the Swedish Energy Agency.

The IIIIEE is also coordinating the Lund University Urban Arena, covering more than 160 researchers within LU active in the research field of urban sustainability. Urban Arena arranges events of internal communication at LU and events in which multiple actors engage in discussing the issues revolving around urban transitions.

The interdisciplinary nature of the research at the IIIIEE is also represented by the publications produced by researchers. Figure 10 below detail the total number of different categories of publications since 2002 and show the number of publications as the result of collaboration across disciplines within the IIIIEE, with Lund University researchers, and with researchers at other universities.

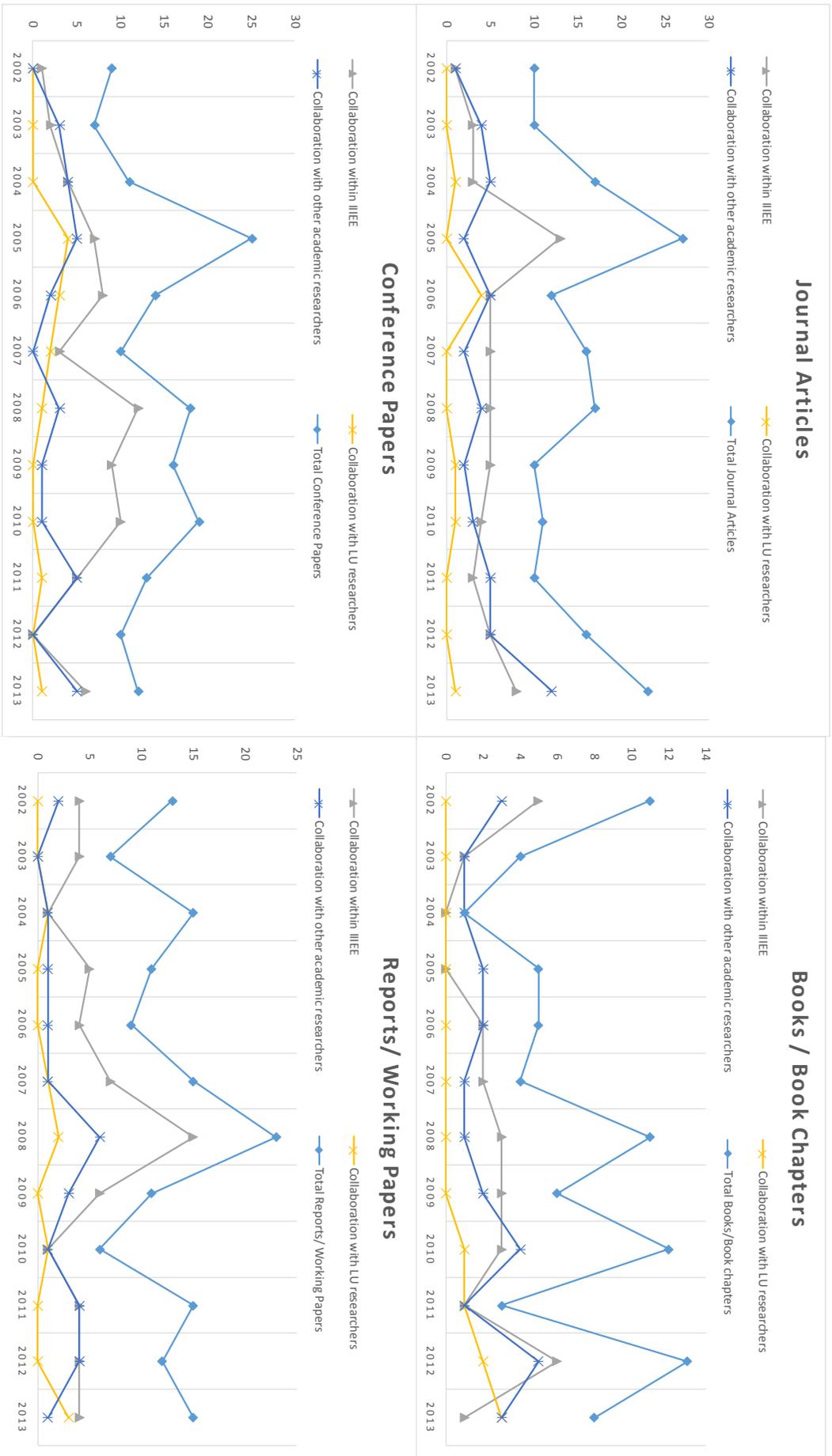


Figure 10. Publications by different categories, 2002-2013.

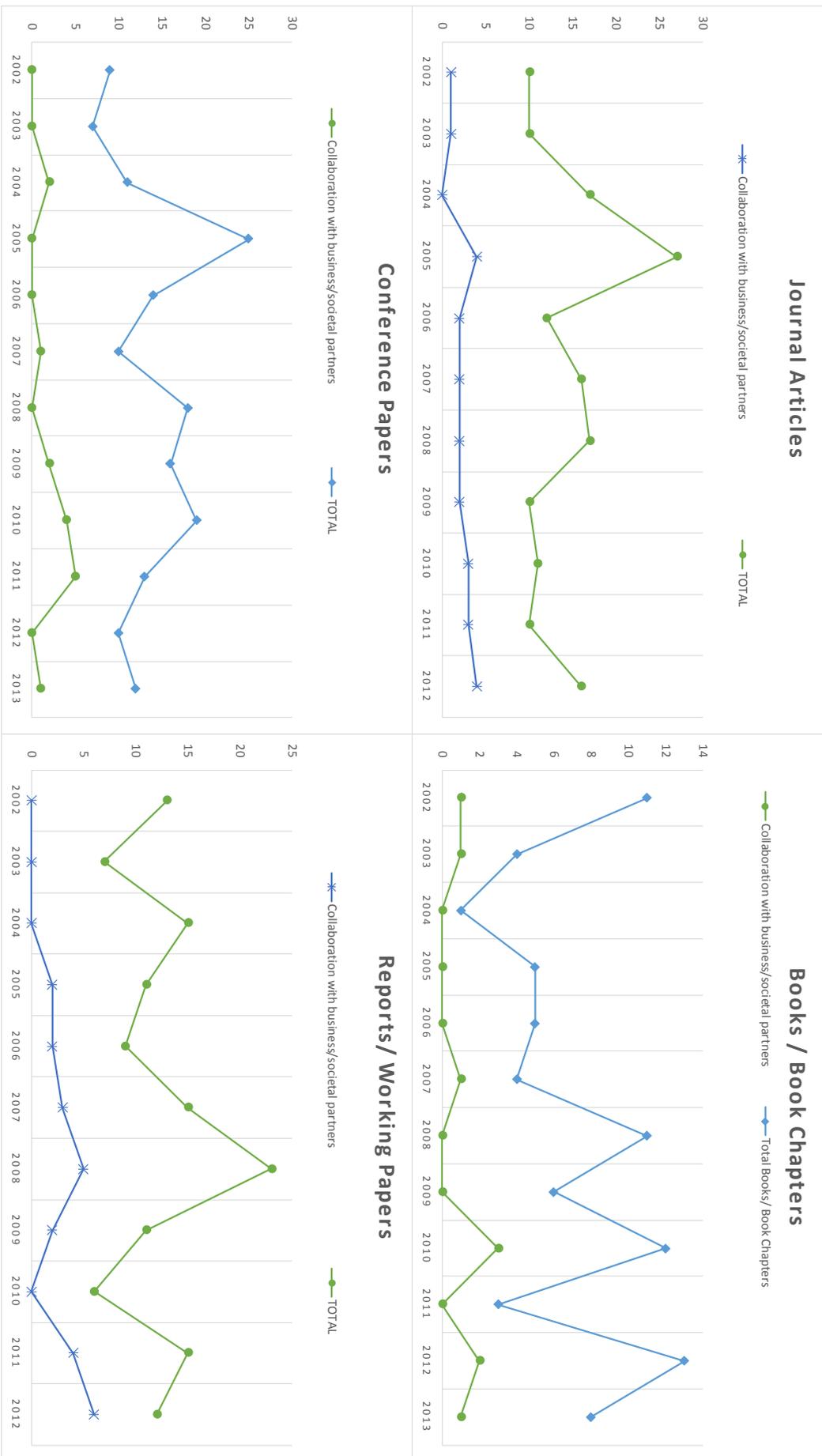


Figure 11. Co-authored publications and total publications 2002-2013.

The collaboration with business and societal actors is demonstrated by the many research projects involving such collaboration. In 2013, 7 research projects were co-financed by business or other societal partners. In addition, there were 6 research projects in 2013 in which business or other societal partners participated but did not finance the project. Research in collaboration with business and societal actors is also demonstrated by publications which are co-authored by these actors. These publications are shown in Figure 11 (organized by publication type with co-authored publications of that type and total publications of that type from 2002-2013).

In addition to publications, between 2007 and 2013, researchers at the IIIIEE have been active in the organization of over a hundred events that have supported interdisciplinary knowledge development. These include conferences, workshops and seminars. IIIIEE researchers are also very active in sharing research and building upon existing knowledge with business and other societal actors in a variety of events including seminars and workshops. Some selected highlights are presented below.

- In 2007, the Green Markets and Cleaner Technologies, Innovation and Environmental Policy workshop organised as part of a project "Green Markets and Cleaner Technologies", funded by Nordic Council of Ministers. The workshop was organised to discuss the general characteristics of innovation policy and environmental policy in the light of findings from case studies of the Pulp and Paper, Electrical and Electronic Equipment and Building sectors. Policy measures influencing innovation activities, such as knowledge creation, access to resources and bringing to market, were the focuses of discussions. Around 30 participants from government bodies of different levels (e.g. EU, Nordic, national environmental ministry and agency, energy agency), funding agencies and researchers of various disciplines (e.g. engineering, economics, law) gathered together to discuss the topic. Similar workshops with government officials have been organized around resource efficiency, ecolabelling, tradable white certificates, among many other salient research topics.
- Environmental Change, Governance and Security Workshop, The Planet 2050 Conference 2008, Lund, Sweden. Close to fifty of the world's leading scientists met in Lund and Malmö for a five day internal workshop named "The Planet in 2050". The meeting was multidisciplinary with leading and innovative scientists from different fields of study such as natural scientists, social scientists, historians and paleoclimatologists, who all contributed on the basis of their field of expertise. During their stay in Lund this "brains trust" aimed at describing desirable futures for Earth in the year 2050 and exploring pathways to move from the present situation toward those futures.
- Models for Collaboration Workshop, Seminar on Sustainable Urban Development in Different World Regions 2009, Lund, Sweden. This was an event inviting international perspectives and regional insights about sustainable urban development and a focus on collaboration and future regional and international partnerships. Presentations by and discussions with invited representatives from international cities – Melbourne, Australia; Berkeley, USA; Freiburg, Germany; and Kitakyushu, Japan.
- The IIIIEE organized events in 2012 and 2013 related to its research on the new green economy. In 2012, the event "Green Economy: Managing the transition to a sustainable economy?" invited one of the original academics in this area and co-author of the book "A New Blueprint for a Green Economy", Anil Markandya to give a keynote lecture and participated in a panel discussion on the topic. In 2013, the "Green Jobs" event was organized with panel representing business, municipalities, and researchers in 2013. The guest speaker was Dan O'Neill, lecturer in ecological economics at University of Leeds, chief economist at the Center for the Advancement of the Steady State Economy (CASSE), and co-author of the book "Enough is Enough".
- Seminars and workshops are also organized with municipalities, some of which are partners in research projects. For example, about 2 to 3 seminars a year for the past three years have been organized with the City of Malmö, Lund, Copenhagen, and/or Lomma and researchers from different disciplines and business actors on sustainable urban development. Additionally, in the IIIIEE' Masters programmes, researchers work with students in applying IIIIEE research through projects requested by municipalities, business and other societal actors.
- The IIIIEE is also the host for the Swedish–Polish Sustainable Energy Platform, which was developed in close collaboration with the Polish Embassy in Stockholm and the Swedish Embassy in Warsaw, plus other relevant stakeholders in each country. The Swedish secretariat at the IIIIEE was established in 2009 and is funded by the Swedish Energy Agency and the Polish secretariat by the Ministry of Economy in Poland. A network of about 400 platform members has been established and continues to grow. The platform has organized a number of events in Sweden (Lund, Kristianstad and Ystad) and in Poland (Zabrze) and has received widespread media coverage. An in-depth case study on biogas production from different organic waste fractions was also conducted in the city of Zabrze by a group of IIIIEE Masters students supervised by IIIIEE researchers.

The collaboration with other researchers, businesses and societal actors is not only evident with the activities that researchers engage in while employed by the IIIIE, but also by the fact that several researchers have been partly employed by business and other society partners. Many are also guest researchers and lecturers at other universities.

3.3 INTERNATIONALIZATION

At the IIIIE in 2013, 25 research staff^{1*} represent 11 different countries of origin while the appointed members of the IIIIE Board (2012-2015) are primarily from Sweden, with one member from Germany. Visiting researchers have represented additional countries and regions around the world.

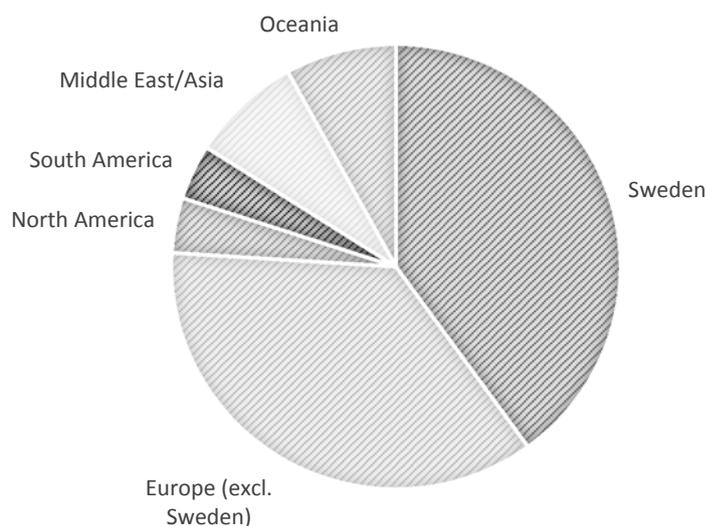


Figure 12. Geographical background of the 25 research staff at IIIIE 2012-2013.

Research at IIIIE is developed in close cooperation with international researchers, but also industries, governments and other stakeholders in a multitude of countries. In research projects, the IIIIE has partnered with over 15 Nordic universities and research institutes, over 60 European universities and research institutes, and over 30 universities and research institutes in the rest of the world. Additionally the IIIIE is partners with over 20 international organizations, over 30 national level ministries and agencies, around 20 municipalities, around 80 businesses, as well as various international and local environmental organizations. A list of examples of partners in these areas can be found in Appendix B. In addition, the networks in which IIIIE is active are outlined below.

- UNESCO - Education for sustainable development
- UNEP expert network on Product Service Systems
- UNIDO network on Chemical Management Services
- Intergovernmental Panel on Climate Change (IPCC)
- Global Energy Assessment (GEA)
- International Society for Ecological Economics
- European Council for an Energy Efficient Economy
- International Association for Energy Economics
- The Sustainable Consumption Research and Action Initiative (SCORAI)
- Research Forum on sustainable consumption
- The Sustainability Transitions Research Network
- SUSPRONET network
- PREPARE network
- Research network of the Centre for Consumer Research
- European Topic Centre on Sustainable consumption and production - EEA
- United Nations Food and Agricultural Organisation (UN FAO)
- F3 consortium (Svenskt kunskapscentrum för förnybara drivmedel)
- Nordic Environmental Law, Governance and Science network (NELN)

¹ * Does not include external PhDs and academic staff without research duties

- Latin American and Caribbean Environmental Economics Programme
- Universities engaged in Energy Research, Education and Training of the European University Association
- World Bioenergy Association.
- ECOTRANS –sustainable development in tourism industry
- IIIIE Alumni Network

LU is a member of LERU and Universitas 21 - within the LERU Universities network, the IIIIE collaborates with the University of Amsterdam, University of Oxford and Utrecht University. Within the Universitas 21 network the IIIIE collaborates with, the University of Melbourne, UNSW Australia and the University of Auckland.

The IIIIE also has instituted a visiting researcher academy with individual researchers spending time every year at the IIIIE, see Table 3. Additionally, guest researchers are hosted through researcher exchange programs like the Erasmus Mundus, MESPOM scholar, the IEBSU (with China) and the NIES (with Japan) exchange programs. The programs with China and Japan have been developed over the last 5 years with a focus on bringing world-class research experience to the IIIIE through exchange of guest researchers and guest professors on special invitation.

Table 3. International Collaboration.

	Total number of visits, programs or institutes	
	2003-2007	2008-2013
Visiting researchers (scholars and doctoral students) staying for at least 3 months	1	13
Research visits (scholars and doctoral students) abroad for at least 3 months	3	1
Regular and invited guest researchers	15	31

The IIIIE has also participated in research projects that are both funded by international bodies as well as those that have an international focus or collaboration. There are 9 IIIIE research projects with International funding in 2013 with financing from the EU, Nordic Council of Ministers, Simon Fraser University, etc. Researchers at IIIIE also participate as experts in projects for the IEA (International Energy Agency), UNEP, UNDP, OECD, and other international organizations.

3.4 LEADERSHIP, TEACHER AND EMPLOYEE EXCELLENCE

The formal university organization is hierarchically structured as a line organization. Since 2012, the IIIIE has been part of Lund University's specific activities (USV) which holds most, but not all, functions of the faculties. USV is a platform for interdisciplinary activities that complement the interdisciplinary projects and research conducted within and between faculties.

The IIIIE Board and the IIIIE Director are the formal decision making bodies at the IIIIE, some decisions are made at higher levels at LU. Formal decisions in relation to research at the IIIIE include broad strategic direction of research, research positions, etc. In 2013, the IIIIE Board decided upon an IIIIE research strategy 2014-2018.

Leadership

In general, leadership of academic research is developed by senior researchers in their role as project leaders, supervisors, members of committees and academies, etc. The leadership of research could be characterized as informal and dynamic. It covers topics and questions such as):

- To be in charge of conceptual coherence, create identity and lead with the focus on a bigger idea than one's own subject
- To connect and include the needs and interests of different actors in a network
- To coordinate work on major applications
- To tread the line between informal networks and fixed organizational structures. To be both "node" and "manager"

To initiate and lead efforts towards new knowledge areas that generate innovation (encounters between terminology universes that embrace new thinking and possibilities for action) In 2010, the IIIIE arranged a first internal workshop on research to improve the internal communication around research at the IIIIE. This is now followed up by annual research meetings and weekly internal research seminars. Other improvements to internal communica-

tion included a new improved webpage and research funding meetings. There are also personal development talks every year when all researchers have the opportunity to discuss his/her work with the Director or deputy Director. Senior researchers (professors and associate professors) are funded by the IIIIE Foundation (by 25% or 15%, respectively) to participate in networks, academies etc. or to develop research applications.

The IIIIE follows Lund University's OHS policy (occupational health and safety). Work is conducted in a systematic manner and monitoring is conducted bi-annually.

Competence and recruitment

IIIIE has 25 researchers 2 with backgrounds from various disciplines representing 11 different countries. The research staff currently consists of 2 professors, 8 associate professors, 7 assistant professors (including 2 post-doc), 7 PhD students, and 1 research assistant. In addition there are regular international guest professors (see Table 3). The IIIIE supports competence development in education and teaching with 75% senior researchers having taken at least 1 course in pedagogy and 63% of senior researchers have taken at least 1 leadership course, see Figure 13.

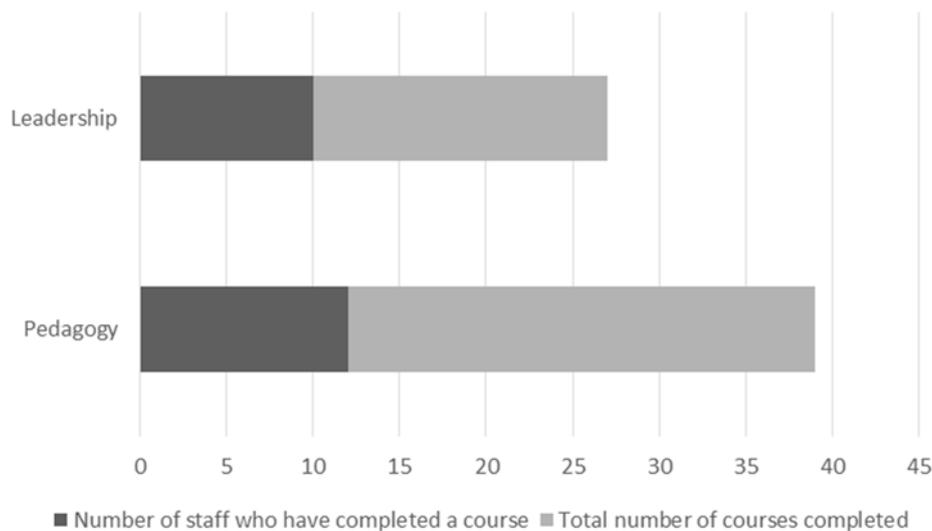


Figure 13. Competence development in education (pedagogy) and leadership.

The goal of the recruitment of researchers at the IIIIE is to secure researchers performing high quality research as well as to include researchers with a broad competence and backgrounds from various disciplines, nationalities and professional experience. Within this, researchers with knowledge related to the three research themes is also prioritized. The IIIIE also seeks to secure researchers with pedagogic excellence and experience in teaching. IIIIE positions are widely announced in open calls with approximately 50-75 international applicants per PhD position and fewer applicants for research positions. Applicants represent a 50-50 gender distribution. In 2014, the IIIIE is to develop and decide on a formal recruitment policy that will formalize these goals.

The number of female senior researchers continues to increase. In 2002 there were no female senior researchers at the IIIIE. In 2013 the majority of senior researchers were male, however, the two professor positions were both female. In 2013, IIIIE Foundation supported a female guest professor and a female Post-doc. The gender ratio of research faculty and PhD students is shown for 2002, 2007 and 2013 in Figure 14.

2 Does not include external PhDs and academic staff without research duties

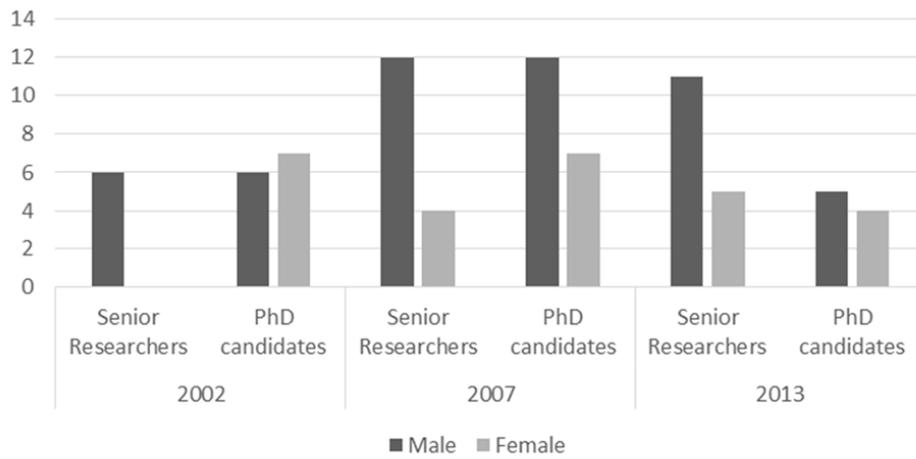


Figure 14. Researchers at IIIIEE.

Career Development at the IIIIEE begins with the PhD program. The majority of graduates of the PhD program (nearly 60%) have pursued careers as academics. Other sectors include government, non-profit, and business (shown in Figure 15).

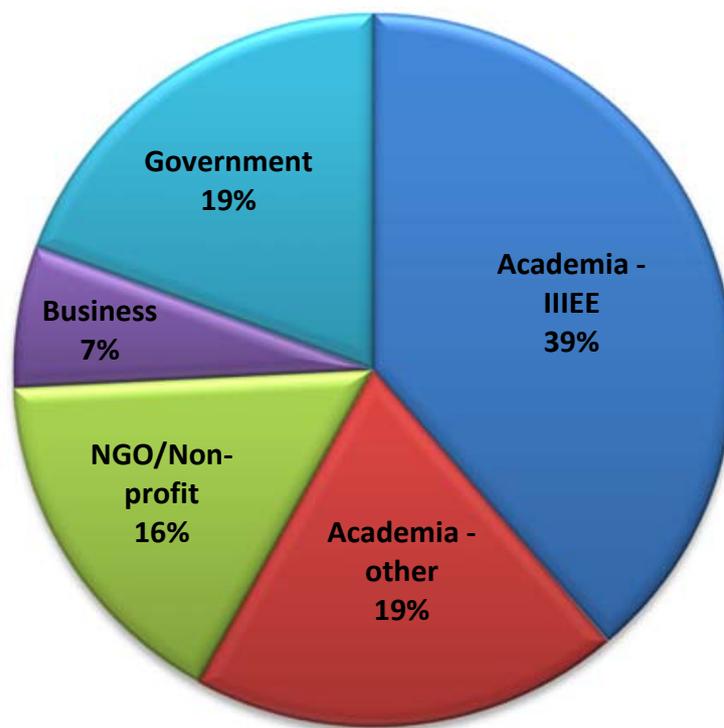


Figure 15. Career paths of PhDs 2002-2012.

4. Comments by Critical Friends

Self-evaluation and the resulting learning and improvement can be greatly supported by the inclusion of an outsider perspective. In the evaluation literature³, the use of Critical Friends is one method often recommended to support formative evaluation. Following this line of reasoning, two Critical Friends were invited to give comments on the IIIIEE research:

- Per Mickwitz, research director and professor at the Finnish Environment Institute (SYKE), Finland
- Susse Georg, professor at Aalborg University, Denmark

They provided comments on the IIIIEE research and on the draft of this report sent out in February 2014 (see Appendix F), and the comments were presented and discussed at a workshop March 6. Comments from the reports by the Critical Friends and comments provided at the workshop are summarised below; some of these were used to further develop and clarify the text in the self-evaluation.

Strengths:

- The relevance of the research is high
- The international cooperation is impressive
- The interdisciplinary experience in research of complex environmental challenges is unique and an important selling point
- The productivity of the IIIIEE is high
- The collaboration with society is good
- The IIIIEE is successful in attracting external funding
The IIIIEE is situated at LU and has the possibility to cooperate with many researchers within the whole university

Weaknesses:

- IIIIEE research identity is vague and the research profile broad
- (Comment by Critical friends - being grant or project driven may make it difficult to develop distinct research profile)
- (Comment by IIIIEE: Due to the comments by our Critical Friends the short text describing the research identity in the first draft was further elaborated in this final report)
- The description of the research needs further development emphasizing how IIIIEEs research challenges, arguments and extends existing research. The theoretical contribution needs to be clearer. And innovative research methods needs to be described.
- (Comment by IIIIEE: This has not been done in the final version of the evaluation)
- The IIIIEE research relies on a limited number of senior researchers (professors)
- A stronger research organization could be discussed – it is not clear if this should be formal or informal.
- The workload of many senior researchers is huge as they are active in many activities - administration, education, research, commissioned research, fundraising, high-level assignments, media etc.. Moreover, a limited number of researchers are (very) active in all these activities.
- It is unclear what research methods are being used
- The visibility of the IIIIEE research is low
- The societal impact of the IIIIEE research is unclear and can be better described in cases (i.e. success stories)
- IIIIEE research depends (fully) on external funding

Opportunities:

- Good opportunities to get funding; Should apply for funding from research councils not usually approached

Threats:

- Reputation. Keep developing good research and publish your work in leading journals. Develop success stories to add to on-going research debates.
- Time and workload. Make sure to safeguard strong competences - strong in scientific writing, fundraising, building strong research groups. Develop promotion and recruitment policies.

3 E.g. Rossman, G., & Rallis, S. F. (2000). Dialogue for learning: Evaluator as a critical friend. *New Direction in Program Evaluation*, 86, 81-92.

5. Conclusions and Implications for further Work

The evaluation has been helpful for the IIIIE to identify the strengths and weaknesses of its research, as well as the opportunities and threats in the environment (see Appendix H, concluding SWOT analysis). It has thus served as a learning experience, which was intensified by the "mirror" presented by our critical friends.

The evidence compiled and the comments received show that IIIIE's research is highly relevant for society, thanks to the uniquely interdisciplinary character of the research and to the close collaboration with business and societal partners. As a result, IIIIE has also been successful in attracting external funding. We also found that IIIIE research is highly international and performs highly in international collaboration. Bibliometric research shows that IIIIE research is of high scientific quality. The quality of research is also reflected in the fact that IIIIE researchers participate in high-level scientific assignments. Further strengths are the fact that IIIIE is part of Lund University and collaborate with several LU departments; indeed, IIIIE has grown to serve as a platform for research cooperation within LU (e.g. Urban Arena). It is also a strength that IIIIE research is linked to educational activities at the IIIIE, including PhD education, while the interdisciplinary and applied nature of research at the IIIIE provides opportunities for career progression in different arenas, both within and outside academia.

We were also able to identify some weaknesses in the evaluation. The main problem is that the IIIIE is a small institute covering many research topics, and fully dependent on external funding for its research. Due to this, the research environment is fragile and it also relies on a limited number of senior researchers (docents and professors). The workload of researchers at the IIIIE is huge as they are active in many activities - administration, education, research, commissioned research, fundraising, high-level assignments, media etc. Moreover, a limited number of researchers are very active in all these activities. Due to the diversity of research topics, IIIIE's research profile is broad and a bit vague, but being grant or project driven will make it difficult to develop a more distinct research profile. While the societal relevance of our research is perceived of as being high, this has not been highlighted as an important outcome of the IIIIE. One way to do so could be via case studies.

The operating environment of the IIIIE presents several opportunities. There is an increasing interest among funding agencies in "sustainability" research, in "interdisciplinary" research and in "transdisciplinary" research. The IIIIE is well positioned to capitalize on these opportunities due to its interdisciplinarity and the societal relevance and co-operation visible in its work. In the wake of a rising interest in transdisciplinarity research and public engagement, the IIIIE could also capitalize on new forms of spreading scholarly knowledge (blogs, Twitter, etc.).

At the same time, there are developments in the operating environment that can constitute threats for the IIIIE. Scarce resources and growing numbers of researchers create increasing competition with other universities and also within LU. Increasing competition is also perceptible with other research institutes in Sweden (e.g. SP). As a counter-development to the increasing interest in societal relevance and transdisciplinary knowledge creation, there is also an increasing drive to quantitatively measure research output and quality using simple measures. IIIIE perceives that standard evaluations of academic quality do not support interdisciplinary and transdisciplinary approaches. Finally, uncertain external funding makes recruiting difficult, and hence hinders the long-term development of a strong research community at the IIIIE.

1. The evaluation offers an excellent starting point for further work in continual monitoring and improvement of the IIIIE's research, as well as for finding improved ways to communicate research efforts and results. Going ahead, we took the following action points out of the evaluation and particularly our critical friends' comments for our continual improvement efforts:
2. The IIIIE is to further develop and strengthen the interdisciplinary, transdisciplinary and international character of the activities at the institute. This to advance cutting edge interdisciplinary research and high quality innovative education.
3. Given the breadth of research areas in which the IIIIE is active, and the strengths and weaknesses that ensue from this broad scope, further effort should be devoted to strengthening and consolidating research and theoretical perspectives so as to build up critical mass and genuine theoretical contribution. This to further strengthen the profile of the IIIIE.

4. We need to monitor and keep abreast of the evolving discussion about how to best measure research outputs and quality. Some indicators are more reflective of the IIIIEE's distinct contribution than others. For example Google Scholar profiles of research staff members can be helpful in order to enhance the visibility of the range of research outputs created by the IIIIEE and their scholarly impact.
5. Since the societal relevance of our research is a distinct strength, we need to be able to demonstrate the societal impact of our work better. We will make an effort to identify, compile and write up a selection of case studies of how our research has benefited society internationally, nationally and on the local level. This will require collaboration among the staff, and can also support a fruitful in-house discussion on the societal impact of research.

More attention needs to be devoted to the IIIIEE's unique profile. Increased self-understanding and better communication could be facilitated by benchmarking, comparing and subsequently discussing the research profile of the IIIIEE to a selection of other research institutes working in similar fields. Such benchmarking can also serve more broadly to keep alive the research evaluation work and to further fill in the picture of the IIIIEE's strengths and weaknesses, and its unique competencies that offer sustained competitive advantage.

Appendix A- List of Researchers 2002-2013

Peter Arnfalk, Associate Professor*
 Mikael Backman, Senior Research Fellow*
 Han Brezet (The Netherlands), Guest Professor
 Torbjörn Brorson, Adjunct Professor*
 Adriana Budeanu, Research Associate
 Aleh Cherp, Associate Professor*
 Olga Chkanikova, PhD candidate*
 Brian Cloughy, PhD candidate*
 Carl Dalhammar, Assistant Professor*
 Vladimir Dobes, PhD candidate (external) *
 Tareq Emtairah, Assistant Professor*
 Magnus Enell, Adjunct Professor
 Ugo Farinelli (Italy), Guest Professor
 Lars Hansson, Associate Professor*
 Eva Heiskanen (Finland), Guest Professor*
 Nay Htun, Guest Professor
 Donald Huisingh, Guest Professor
 Shunsuke Itoh (Japan), Guest Professor,
 Allan Johansson (Finland), Guest Professor
 Thomas B. Johansson, Professor
 Niina Kautto, PhD candidate
 Bernadett Kiss, PhD candidate *
 Beatrice Kogg, Assistant Professor*
 Martin Kurdve, PhD candidate
 Charlotte Leire, Lecturer*
 Thomas Lindhqvist, Associate Professor*
 Kes McCormick, Assistant Professor*
 Mårten Karlsson, Assistant Professor*
 Peter Kisch, Assistant Professor
 Tomas Kåberger, Adjunct Professor
 Matthias Lehner, PhD candidate*
 Shixiang Long (China/Japan), Guest Professor
 Pia Långström, PhD candidate*
 Panate Manomaivibool, PhD candidate
 Oksana Mont, Professor*
 Luis Mundaca, Associate Professor*
 Dagmara Nawrocka, PhD Candidate
 Lena Neij, Professor*
 Robert Nemeskeri, PhD candidate (external)
 Helen Nilsson, PhD candidate
 Renato J. Orsato, Assistant Professor
 Alvar Palm, PhD candidate*
 Thomas Parker, PhD candidate (external) *
 Philip Peck, Associate Professor*
 Andrius Plepys, Assistant Professor*
 Jessika Luth Richter, Research Assistant*
 Håkan Rodhe, Associate Professor *
 Chris van Rossem, PhD Candidate
 Chris Ryan (Australia), Professor
 Kaisu Sammalisto, Research Associate
 Hanna Savola, Research Assistant
 Åsa Skillius, PhD Candidate
 Nora Smedby, PhD candidate*
 Lars Strupeit, PhD candidate*

Camelia Tepelus, PhD candidate
 Åke Thidell, Assistant Professor*
 Naoko Tojo, Associate Professor*
 Yuliya Voytenko, Project Assistant*
 Ulrika Wennberg, PhD candidate
 * Present in 2013

Appendix B- International Partners 2002-2012

Nordic universities and research institutes: SLU Alnarp (Sverige), Malmö Högskola (Sverige), KTH (Sverige), Luleå Tekniska Universitet (Sverige), Chalmers tekniska högskola (Sverige), Aalborg University (Denmark), Technical University of Denmark (Denmark), University of South Denmark (Denmark), Copenhagen Resource Institute (Denmark), Risø National Laboratory (Denmark), University of Oslo (Norway), Finnish Consumer Research Centre (Finland), Hanken School of Economics (Finland), VTT Technical Research Centre (Finland), The Finnish Environment Institute (Finland), etc.

European universities and research institutes: University of Manchester (UK), Tyndall Centre for Climate Change Research (UK), Oxford University (UK), Business School- University of Hertfordshire (UK), Manchester Business School (UK), Aston University (UK), RPA (Risk & Policy Analysts (UK), International Recourses and Recycling Institute (UK), University of Ireland Cork (Ireland), Utrecht University (the Netherlands), United Nations University-MERIT (the Netherlands), Netherlands Energy Research Foundation, ECN (The Netherlands), University of Maastricht (the Netherlands), Delft University of Technology (the Netherlands), Ministry of Housing, Spatial Planning and the Environment (VROM) (the Netherlands), Forschungszentrum Karlsruhe FZK (Germany), ZSW (Germany), Institut für Energie- und Umweltforschung Heidelberg GmbH (Germany); Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany), Institut für Energiewirtschaft und Rationelle Energieanwendung (Germany), EPEA Internationale Umweltforschung GmbH (Germany), Institute for Energy and Environmental Research Heidelberg (Germany), Institute for International and European Environmental Policy (Germany), Collaborative Centre on sustainable consumption (Germany), Wuppertal Institute (Germany), Institute for International and European Environmental Policy (Germany), ETH Zurich (Switzerland), Paul Scherrer Institut, (Switzerland), Institute of Energy Research (Austria), University of Technology Vienna (Austria), National Institute for Agricultural Research, INRA (France), Bureau de Recherches Géologiques et Minières (France), Social Innovation Centre, INSEAD (France), University of Technology Vienna (Austria), International Institute for Applied System Analysis (IIASA), Politecnico di Milano (Italy), Politecnico di Torino (Italy), Scuola Agraria del Parco di Monza (Italy), University of Rome (Italy), Institute for Economic Research on Firms and Growth under the National Research Council (CERIS-CNR) (Italy), Scuola Agraria del Parco di Monza (Italy), University of Sevilla (Spain), University of Vigo (Spain), University of the Algarve (Portugal), University of Coimbra (Portugal), University of the Aegean, CRES (Greece), CEU (Hungary), EC Baltic Renewable Energy Centre, EC BREC (Poland), Gdansk University of Technology (Poland), Glowny Instytut Gornictwa Central Mining Institute, GIG (Poland), Central Mining Institute (Poland), Kaunas University of Technology (Lithuania), Belarusian National Technical University, National Forestry University of Ukraina (Ukraine), Stockholm Environment Institute in Tallinn, Latvian Pollution Prevention Centre (Latvia), National Technical University of Ukraine in Kiev (Ukraine), "Georghe Asachi" Technical University in Iasi (Romania), Polytechnic University of Bucharest (Romania), "Babes-Bolyai" University of Cluj-Napoca (Romania), "Transilvania" University of Brasov (Romania), Timisoara University (Romania), Politehnica University of Timisoara (Romania), etc.

World universities and research institutes: University of California (USA), University of Illinois (USA), Lawrence Berkeley National Laboratory (USA), Yale University (USA), Tufts University (USA), Harvard University (USA), University of Wisconsin (USA), Duke University (USA), University of Tennessee (USA), Institute for Sustainable Solutions (USA), New Jersey Institute of Technology (USA), Clean Production Action (Canada), Melbourne University, Center for Climate Economics and Policy (Australia), University of New South Wales (Australia), Victoria University (New Zealand), University of Auckland (New Zealand), University of Auckland (New Zealand) MOTU (New Zealand), El Colegio de Mexico (Mexico), Akatu Institute for Conscious Consumption (Brazil), Universidad Católica de Argentina (Argentina), University of Jordan (Jrodan), Jordan University of Science and Technology (JUST) (Jordan), University of Utsunomiya (Japan), The Faculty of Engineering , University of Zagazig (Egypt), The Jerusalem Institute for Israel Studies (Israel), Tel Aviv University (Israel), National Institute of Environmental Studies (Japan), The National Institute for Environmental Studies, Ibaraki (Japan), The School of Economics at Shandong University (China), Energy Research Institute (China), etc.

International organizations: European Commission, European Parliament, European Environmental Agency (EEA), UNESCO, UNDP, UNEP, OECD, Global Network on Energy for Sustainable Development (GNESD), Nordic Council of Ministers, World Bank, European University Association, IPCC , International energy Agency (IEA), Centre for Environmental Technology (CENTEK) - Swedish Embassy, USAID, Aqaba Special Economic Zone Authority (Jordan), Arab Forum for Environment and Development (AFED) (Beirut), Saudi General Investment Authority

(SAGIA), Industrial and Commercial Bank of China (ICBC), Ministry of Water and Electricity (Saudi Arabia), Building Performance Institute Europe (BPIE), Brussels, etc.

Ministries and agencies: Swedish Ministry of Industry, Swedish Ministry of Environment, Swedish EPA, Swedish Energy Agency, Swedish Chemicals Agency, Swedish International Development Cooperation Agency (Sida), The Swedish Transport Authority, National Courts Administration, Swedish Board for Study Support, Swedish Social Insurance Agency, Swedish Post and Telecom Agency, National Police Board, Swedish Agency for Economic and Regional Growth, Swedish Customs, , Government of the Republic of Moldova, Danish EPA, ADEME (France), DEFRA (UK), Enova (Norway), CESI (Italy), Austrian Energy Agency (Austria), APAT (Italy), ARMINES (France), National Consumer Research Centre (Finland), Research Council of Norway (Norway), Ministry of the Environment (Georgia), Ministry of Environment and Ministry of Economy and Department of Energy Security and Efficiency (of Moldova), Dansk Energi (Denmark), Ministry for Justice and Home Affairs (Malta), Research Council of Lithuania (Lithuania), Federal Environment Agency (UBA), Germany, The Regional Environment Center for Central and Eastern Europe, REC, (Hungary), Science and Technology Section, Embassy of Sweden in Japan, etc.

Industries and industry associations: Svenska hus, Elforsk, Teknikföretagen, BIL Sweden, Swedish Waste Management, H&M, ICA, COOP, Verner Frang AB, Telia AB, Sustainable Business Hub, Lunds Klimatallians, Chemicals Branch, Global Ecolabeling Network, E.On., Lunds Energi/Kraftringen, World Business Council for Sustainable Development, Endesa, Enel, Aboca s.p.a., German Technical Cooperation Agency, Ecofys, Öresund Logistics, Sweden, Skistar, Hafslund, TEP Energy Zurich, Switzerland, Econcept AG Zurich, Lundalogik, Parajett, LSR, Rentar Sweden, Huhnseal, SWEP, Högestad & Christinehof, Göteborg Energi, the Swedish District Heating Association, Vingården i Klagshamn, Felix AB, Eslöv municipality wastewater treatment plant, Wanås Estate, SYSAV AB, Källby wastewater treatment plant, Stora Enso Hylte Mill AB, The Absolut Company AB, Alfa Laval Lund AB, Sandvik Mining and Construction AB, Svedala, Gonzalez Byass (Spain), Codorniu Group (Rimat winery, Spain), Business Center Bornholm (Denmark), Rå Epok, Ringsjöstrand Resort, Trelleborg AB, Skanska Sverige AB, Heidelberg Cement AB, AB Volvo Trucks, IKEA AB, Vestas Northern Europe AB, Ruukki Sverige AB, Islan Asset Management (Switzerland), Backer BHV, Sony Ericsson AB, Knorr-Bremse Nordic Rail Service Center, IKANO real Estate, Scan AB, Sydsvenska Dagbladet, Ideon Lightfoot Academy, AECOM (Australia), Green Tech Media, Sobeys, VA-syd AB, Stena Metall AB, Goodpoint Consultants AB, Vattenfall AB, TEM Foundation, European Spallation Source Scandinavia, Chalmers Industriteknik, IVL Svenska Miljöinstitutet, Elsam A/S (Denmark), Sony, Electrolux, Nokia, etc.

Various municipalities, e.g. Københavns kommun, Malmö stad, Lunds kommun, Roskilde kommun, Ballerup kommun, Lomma kommun, Helsingborgs stad, Landskrona kommun, Trelleborgs kommun, Kristianstad kommun, Lundamark AB/Lund Science Village, Region Skåne, City of Umeå, ICLEI, Chisinau Municipality (Republic of Moldova), City of Zabrze (Poland), Municipality of Zarkolany (Poland), etc.

Environmental organizations: Greenpeace International, European Environmental Bureau, Friends of the Earth, WWF, Clean Production Action etc.

Appendix C: Research Project List 2013

Project name	TEMPUS MANSUR - Master on sustainable development and renewable energy
Funding agency	EU
Project leader	Università degli studi di Roma 'La Sapienza'
Responsible researcher IIIIE	Philip Peck
Academic partners	Building Physics Lund University, Sapienza University of Rome, Jordan University of Science & Technology, M'utah University, University of Durham, University of Jordan
Project name	Energi Öresund
Funding agency	EU
Project leader	Öresundsuniversitet c/o Roskilde universitet
Responsible researcher IIIIE	Mikael Backman
Academic partners	Aalborg University, Lunds Universitet, Roskilde University
Project name	Urban Arena/Portal Hållbar stadsutveckling
Funding agency	Lund University
Project leader	Lena Neij
Academic partners	App 200 researchers within LU
Project name	Biofuel Network LU
Funding agency	Lund University
Project leader	Kes McCormick
Academic partners	AgriFood Economics Centre, Applied Microbiology, Biochemistry, Biotechnology, Cell and Organism Biology, Center of Analysis and Synthesis, Chemical Engineering, Environmental and Energy Systems Studies (IMES)
Business partners etc.	Swedish Knowledge Centre for Renewable Transportation Fuels (F3 Centre)
Project name	Sekretariat för Svensk-Polska Energiplattformen
Funding agency	Energimyndigheten
Project leader	Mikael Backman
Academic partners	PIMOT (Automotive Industry Institute)
Business partners etc.	Swedish Embassy in Warsaw, Polish Embassy in Stockholm
Project name	The Emerging Bio-Economy: Investigating the role of communication and stakeholder involvement
Funding agency	FORMAS
Project leader	Kes McCormick
Project name	Hållbar Butik - Att stödja gröna och etiska marknader: dagligvaruhandelns roll
Funding agency	FORMAS
Project leader	Oksana Mont
Academic partners	Avdelningen för sociologi vid Lunds universitet
Business partners etc.	ICA, Coop, Axfood, Bergendahls and Netto; Tesco, UK; Billa, Austria; Irma, Denmark, Svensk Dagligvaruhandel, KRAV, Sveriges Konsumenter; Konsumentföreningen Stockholm, and Svanen ecolabels

Project name	Solenergi i stadsplanering
Funding agency	FORMAS
Project leader	Lena Neij
Academic partners	Energy and Building Design (LTH/LU), Building Physics (LTH/LU), Department of Industrial Electrical Engineering and Automation (LTH/LU) (Malmö University, Swedish University of Agricultural Sciences)
Business partners etc.	Malmö City, Lund City, Öresund Energy, Krafringen, (E.ON)

Project name	Lomma Hamn Miljöuppföljning
Funding agency	Delegationen för Hållbara städer
Project leader	Lomma kommun
Responsible researcher IIIIEE	Åke Thidell
Academic partners	SLU Alnarp
Business partners etc.	Lomma kommun

Project name	Styrmedel för en konkurrenskraftig grön ekonomi och etablering av ny energiteknik
Funding agency	Energimyndigheten
Project leader	Lena Neij/Luis Mundaca
Academic partners	Technical University of Denmark; University of Seville, Spain; National Renewable Energy Laboratory, USA; Tufts University, USA; Harvard University, USA; Delaware University, USA; China Academy of Building Research, China; Indira Gandhi Institute for Research Development, India; Solar PV companies, Germany; Chinese Wind Energy Association, China; Basque Centre for Climate Change, Spain; World Bank (USA); International Renewable Energy Agency; and Ministry of Energy/Environment (Chile).

Project name	Water Management Study in Kursedong, India
Funding agency	SIDA
Project leader	IVL Svenska miljöinstitutet
Responsible researcher IIIIEE	Andrius Plepys
Academic partners	IVL Svenska miljöinstitutet
Business partners etc.	Kurseong municipality, Artamus

Project name	ETC/SCP European Topic Centre on Sustainable Consumption and Production
Funding agency	The European Environment Agency
Project leader	Copenhagen Resource Institute
Responsible researcher IIIIEE	Oksana Mont
Academic partners	Copenhagen Resource Institute (CRI), Denmark; Federal Environment Agency (UBA), Germany; Wuppertal Institute (WI), Germany; UNEP/Wuppertal Institute Collaborating Centre on SCP (CSCP), Germany; The Regional Environment Center for Central and Eastern Europe (REC), Hungary; titute for Economic Research on Firms and Growth under the National Research Council (CERIS-CNR), Italy; iversità Cattolica del Sacro Cuore, Italy; Waste & Resources Action Programme (WRAP), UK

Project name	Resfria Möten - vad blir effekterna och hur redovisar man dem?
Funding agency	Energimyndigheten, Trafikverket
Project leader	Oksana Mont/Peter Arnfalk
Business partners etc.	18 Swedish authorities: Arbetsförmedlingen, Bolagsverket, CSN, Energimyndigheten, Försäkringskassan, Jordbruksverket, Kammarkollegiet, Lantmäteriet, MSB, Naturvårdsverket, Pensionsmyndigheten, Post- och telestyrelsen, Riksarkivet, Rikspolisstyrelsen, Skatteverket, Tillväxtverket, Trafikverket, Transportstyrelsen, Tullverket

Project name	InnoHeat - Innovation in District Heating
Funding agency	EU
Project leader	Region Skåne
Responsible researcher IIIIEE	Philip Peck
Business partners etc.	Region Skåne, Chamber of Commerce Polish District Heating, Lithuanien District Heating Association, The Germa Heat and Power Association, The Swedish Int. Development Cooperation Agency, European Spallation Source ESS AB, The Swedish District Heating Ass, Distric Heating Ent Ltd, Sustainable Hub, The Municipal Thermal Power Industry LTtd
Project name	Urban Transition
Funding agency	EU
Project leader	Lunds universitet, LU Open
Responsible researcher IIIIEE	Lena Neij
Academic partners	Malmö University, Swedish University of Agriculture Sciences, Aalborg University, Roskilde University
Business partners etc.	Copenhagen City, Roskilde City, Ballerup City, Malmö City, Lund City
Project name	SPREE - Servicizing Policy for Resource Efficient Economy
Funding agency	EU
Project leader	Research Council of Lithuania
Responsible researcher IIIIEE	Oksana Mont
Academic partners	Research Council of Lithuania, Oxford University, Surrey University, University of Santiago de Compostela, Consellería de Innovación e Industria, Finnish Environmental Institute, Delft University of Technology, Jerusalem Institute for Israel Studies, Tel Aviv
Project name	Nya affärsmodeller och affärsmöjligheter inom belysningsområdet: betydelsen av styrmedelskombinationer och upphandlingens organisation
Funding agency	Energimyndigheten
Project leader	Thomas Lindhqvist
Project name	CCICED - China Council for International Cooperation on Environment and Development
Funding agency	Simon Fraser University
Project leader	Oksana Mont
Business partners etc.	Collaborating Centre on Sustainable Consumption and Production, Germany; Instituto Akatu pelo Consumo Consciente, Brazil, New Jersey Institute of Technology, Newark, NJ, USA, the Science and Technology Committee of Ministry of Environment Protection (MEP) (China), Academic Committee of National Development and Reform Commission (NDRC) (China), China-ASEAN Environmental Cooperation Center, Policy Research Center for Environment and Economy (PRCEE), Department of Consumption and Economy of Chinese Academy of International Trade and Economic Cooperation (CAITEC)
Project name	Ekodesign för stärkt innovationsförmåga, konkurrenskraft och förbättrad miljöprestanda: ekodesigndirektivets potential i en dynamisk kontext
Funding agency	Energimyndigheten
Project leader	Carl Dalhammar
Academic partners	NIES (Japan), Aalborg University
Business partners etc.	Nordic Council of Ministers, Teknikföretagen
Project name	AES - Allmänna energisystemstudier - Gästprofessur
Funding agency	Energimyndigheten
Project leader	Luis Mundaca

Project name	Material Efficiency Mangement in Manufacturing - MEMIMAN
Funding agency	MISTRA - Stft för miljöstrategisk forskning
Project leader	Mälardalens högskola
Responsible researcher IIIIEE	Thomas Lindhqvist
Academic partners	Mälardalens högskola, Swerea IVF
Business partners etc.	Volvo (VGRE, VGTT, VCE), Stena, Dynamate (Scania), Concentric, Alfa Laval, MiljöGiraff
Project name	Developing a Pilot Pollutant Release and Transfer Registration in Tianjin inhai New Area
Funding agency	EU
Project leader	Teda Eco Center, China
Responsible researcher IIIIEE	Philip Peck
Business partners etc.	Teda Eco Center, Teda Environmental Protection Ass.
Project name	EPR - An extended producer responsibility system and new business models to increase reuse and recycling of textiles in the Nordic region
Funding agency	Nordiska Ministerrådet
Project leader	Copenhagen Resource Institute
Responsible researcher IIIIEE	Naoko Tojo, Thomas Lindhqvist
Academic partners	Copenhagen Resource Institute, IVL Svenska Miljöinstitutet, Högskolen i Östfold, Environice, Syke
Project name	Interreg IVB North Sea Region Program 9th call, D2D Project - From Development to Dis-semination
Funding agency	EU
Project leader	The Central Denmark Region and Province of Fryslan, Department of European Programmes & Project
Responsible researcher IIIIEE	Mikael Backman
Academic partners	University of Aalborg, University of Edinburgh, TUDelft (NL), International Resources Recycling Institute -IRRI (UK)
Business partners etc.	Vlieland (Island), Insel- und Halligonferenz (DE), Kortrijk (BEL), Leeuwarden City (NL), Aalborg City (DK), City of Copenhagen, Skien (N)
Project name	Malmö Sydost Innovationsplattform
Funding agency	VINNOVA
Project leader	Malmö kommun
Responsible researcher IIIIEE	Lena Neij
Academic partners	Malmö University, Swedish University of Agricultural Sciences
Business partners etc.	Malmö kommun, Region Skåne, MEDEA, Media Evolution AB, MKB Fastighets AB, E.ON AB etc (in all 21 partners)
Project name	Styrmedel och affärsmodeller för slutna materialkretslopp
Funding agency	Energimyndigheten
Project leader	Thomas Lindhqvist

Appendix D: Framework for the Evaluation of Societal Impact

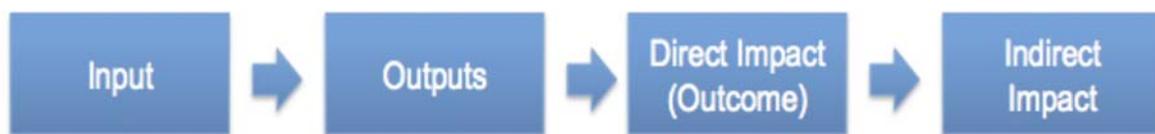
Impact as defined by RCUK

Impact embraces all the extremely diverse ways in which research-related knowledge and skills benefit individual, organizations and nations by:

- Fostering global economic performance and competitiveness
- Increasing the effectiveness of public services and policy
- Enhancing quality of life, health and creative output.

How to evaluate impact

The evaluation of research impact could be seen in terms of a simplified, linear model describing an impact chain.



In this model we define

- Input as the financial, human and material resources used in the project
- Output as the items provided by the project (meetings, seminars, workshops, website, reports/papers, guidelines and recommendations)
- Direct impact (outcome) as the short-term effects of the project
- Indirect impact as the long-term effects of the project

The impact evaluation can focus on various indicators describing aspects of direct impact and indirect impact.

	Direct impact	Indirect impact
Collaboration and visibility nationally and internationally	<ul style="list-style-type: none"> • Number of decision makers (government, business, others) attending meetings/seminars/workshops • Research grants from international organizations • Advisory & research work performed for international organizations • Publications co-authored with researchers from other institutions • Website visitors to IIIIEE (and projects in which it participates) 	<ul style="list-style-type: none"> • Visibility in the media (press, TV, etc.) • ? it would be good to get some measures of international visibility here, since the IIIIEE is pretty good at this
Public policy	<ul style="list-style-type: none"> • Invited talks or workshops organized for government representatives • Involvement in contracted research for government • Involvement in committees or advisory bodies for government • Involvement in collaborative projects with (local) government 	<ul style="list-style-type: none"> • Research results being used (or referenced) in governmental/organizational investigations • Research results being used in the design of new policy instruments, legislation or political decisions.
Innovation and business	<ul style="list-style-type: none"> • Invited talks or workshops organized for business representatives • Involvement in innovation and development projects 	<ul style="list-style-type: none"> • Research results being used to design or commercialize new products of production processes • Research results being used to design or commercialize new services • Research results being used to design or commercialize new businesses of business models
Education and training	<ul style="list-style-type: none"> • Number of PhDs awarded • State-of-the art research applied in Master's education 	<ul style="list-style-type: none"> • PhDs employed by business, authorities or other societal partners • Satisfaction of alumni

Literature:

Research Councils UK (RUCK), Excellence with impact (www.ruck.uk)

Juhlin, Tang, and Molas-Gallart, 2012, Study of the Contribution of Social Scientists to Government Policy and Practice, Economic and Social Research Council, UK

Meagher, 2013, Research impact on practice: case study analysis, Economic and Social Research Council, UK

Johnson and Williams, 2011, Evaluating the impact of social science, Economic and Social Research Council, UK

Priem, J., 2013, Scholarship: Beyond the paper. *Nature* 495: 437–440

Grant, J., Brutscher, P.-B., Kirk, S.E., Butler, L. Wooding, S., 2010, Capturing Research Impacts: A review of international practice. RAND Europe for the Higher Education Council of England

Jong, S. P., van Arensbergen, P., Daemen, F., van der Meulen, B., & van den Besselaar, P., 2011, Evaluation of research in context: an approach and two cases. *Research Evaluation*, 20(1), 61-72.

Bornmann, L., 2013, What is societal impact of research and how can it be assessed? A literature survey. *Journal of the American Society for Information Science and Technology*, 64(2), 217-233

Appendix E: Bibliometric Methodology Notes

It should be noted and the scientific journals related to the applied field of sustainable development are not all included in standardised systems of measuring quotation. Due to this, results of such analysis will have limitations in presenting the quality of the research performed at IIIIEE. Still, we have performed some analysis by using traditional tools for measuring quality of the research.

H-index Values – performed by Ingela Wahlgren, Librarian at IIIIEE and individual researchers

The H values for individual researchers were calculated in Web of Knowledge, Scopus and Google Scholar. The Scopus H values are presented in this report as the results were more robust with less ambiguity over time than Web of Knowledge. Scopus is also a larger database that included more

journals where IIIIEE researchers publish. However, one noted limitation of Scopus is that it only includes publications from 1996 onwards in calculating the H-index value. This date roughly coincides with the establishment of the IIIIEE (in 1995) so the Scopus h-value is also indicative of the researcher's impact while at the IIIIEE. However, it should be noted that researchers with significant publications before 1996 (1 previous researcher and 1-2 current researchers at the IIIIEE) likely have a marked decrease in their H value because of this method. The Google Scholar H values were calculated by individual researcher profiles in which the list of publications used by Google to calculate the value were quality checked by the individual researchers.

Citations – performed by Mikael Graffner, Bibliometrics, Lund University

The citation report is from Web of Science, based on 90 publications published 2002-2011. Report created 2014-01-27. It is not appropriate to study the most recent years since it always takes some time for publications to get recognized and cited. In order to get an idea of the development two periods are studied, 2002-2005 and 2007-2011. To make the periods comparable the citations are measured using a fixed 7 year citation window for both periods. For the 2002-2006 period citations are measured up until 2007 and for the 2007-2011 period citations are measured up until 2013. There is a rise in the average number of citations per paper during the period from an average of 3,7 for the first period to 13,4 in the latter.

Publishing years	CPP	Median	Number of documents
2002-2006	3,7	2	51
2007-2011	13,4	6	39

CPP=citations per paper. Data collected from the Web of Science 2014-01-24

Using more advanced indicators it is possible to see the citation rates for the papers from IIIIEE compared to the citation rates for the average publications in the particular journals in which the IIIIEE papers have published. The indicator C/JCS shows the citation rate for IIIIEE compared to average citation rates in the journal set and also takes publication type and age into consideration. 1,0 represents the world average for publications in the journal set and values above show a citation rate that is above the average and vice versa. IIIIEE papers have been cited less than the average publication in the first period (0,77) In the second period the citation rate has increased and is almost at the same level as the average for the journal set. (This data was available for 85 of 90 documents).

Publishing years	C/JCS	Number of documents
2002-2006	0,77	49
2007-2011	0,97	36

C/JCS=journal normalized citation score. Data from Thomson Reuters InCites, 2014-01-24.

Appendix F: Comments by the Critical Friends

COMMENTS TO THE IIIIEE RESEARCH SELF-EVALUATION 2014, BY THE CRITICAL FRIEND PER MICKWITZ

Introduction: My general impression of the research at the IIIIEE and of the self-evaluation

My general impression is that the IIIIEE has managed very well with respects to the four criteria: 1) Quality enhancement, 2) Cross-boundary collaboration, 3) Internationalization, and 4) Leader, teacher and employee excellence. Furthermore I think that the self-evaluation is based on substantial data and is generally based on correct and sufficient analyses. My small suggestions with respect to evaluation methods as well as strengths and weaknesses should be read against this background.

A crucial issue for the future of the research at IIIIEE is that it has three themes, but quite limited resources (25, research staff and 12,5 FTE).

Methodological issues

It would be valuable to get the data on inputs, outputs and impacts also per theme. One possibly limiting factor for the future success of IIIIEE is the availability of inputs to carry out new projects. In order to be able to assess this it would be valuable to get information on how the workload of staff and how the project funding from the external sources is allocated to the different themes. Similarly the number of Professors and Docents (i.e. senior researchers with the formal qualifications to apply for e.g. Formas funding).

In relation to the citations you state *“the Scopus database only includes publications from 1996 onwards ... the Scopus database does not include reports and other publications, some of which have been cited extensively”*. The use of Google Scholar is generally better with respect to these factors and the academic backgrounds of the IIIIEE staff. Since the number of staff is quite limited it would be easy to use Google Scholar through Publish or Perish.

In section 2.4, the societal impacts of IIIIEE research are described. In the section you largely focus on what you have done (projects undertaken, memberships in committees, etc.) to generate societal impacts. While, doing things is a pre requisite for having societal impacts, it is not sufficient. The societal impacts will depend on how the activities are done and how they interact with actors and processes beyond the IIIIEE (the intervention theory of how the societal impacts are to be generated). A stronger focus on impacts instead of activities would be useful.

Currently, the most interesting effort to assess the societal impacts of research is going on in the United Kingdom. (See for example Michael Power 2013 *“The politics and practice of research evaluation in the United Kingdom”*.⁴) The U.K. approach is based on case studies; it could be interesting to consider e.g. IIIIEE's work on extended producer responsibility as an impact case study utilizing the U.K. methodology. Is there some double counting in the figures on publications? In many cases conference and working papers later on are developed into journal articles.

Strengths of the IIIIEE Research

There are many strengths of the research at IIIIEE. Firstly, the demand for the knowledge of the type that IIIIEE produce is increasing and will be doing so for a long time. This is due to the fact that the world is not sustainable and with respect to many crucial issues, there has been no or very limited progress during the last decades. This is bad for the world, but creates the demand for the knowledge produced by the research at IIIIEE. Furthermore there has been a shift in the framing of the issues: *“The challenge of sustainable development is increasingly understood in terms of ‘transitions’ to more sustainable socio-technical systems.”*⁵ This increases the relevance of the approaches developed and used at the IIIIEE.

The funding opportunities in Horizon 2020 as well as from many Swedish funders look very promising for the IIIIEE.

Radically new approaches are needed in order for humanity to address the sustainability challenges. Often the

4 http://svuf.nu/data/gesamp/files/file_element/92e45b23d9786606afb8f83a5d34d41a/Power_Swedish_Eval_soc_2013.pdf

5 Smith, A., Voß, J-P. and Grin J. 2010. Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research Policy* 39(4): 435–448.

new approaches are developed through innovative combinations of different academic backgrounds. The fact that IIIIE is situated at a major and very broad university is an enormous resource, as long as the institute can develop new collaborations in an open-minded way.

IIIIE is very strong in internationalization. The only question, that the material does not fully answer, is if the collaboration is strong enough with the countries/institutions where the scientific frontier is developed (e.g. the cooperation with the top universities in the USA).

Weaknesses of the IIIIE Research

As already mentioned a potential weakness of IIIIE is its size, especially taking into account that the IIIIE has three themes. A small size results in a lot of fluctuations (as can be seen from the figures in the report) and it makes the institute fragile for periods when several research proposals are not being funded.

The limited amount of senior researchers with the formal qualifications (or not strong enough CVs compared to the competitors) to apply for and lead externally funded projects could also be a major weakness for the IIIIE. Although the IIIIE is situated at a large and a broad university there is a risk that the cooperation is focused on the disciplines closest to the subject areas of the IIIIE. While collaboration with more distant subjects is likely to require more effort and time the most interesting new openings might be found that way.

Other reflections

In Appendix I you state as a weakness that *“IIIIE research has had low visibility”* and as an opportunity that *“IIIIE perceives that new forms of spreading scholarly knowledge are emerging (blogs, etc.)”*. In order to enhance the visibility of IIIIE research I would recommend that all IIIIE researchers would create personal Google Scholar pages (it takes about 10 minutes to make a personal Google Scholar page). In addition I would suggest that both the IIIIE and individual researchers would start to use Twitter to comment on current debates and to market IIIIE publications (there are many good examples, e.g. Maarten Hajer at PBL).

The majority of the external funding of IIIIE is from three sources: Energimyndigheten, EU and FORMAS. There seems to be possibilities to expand the portfolio to other Swedish sources, such as vetenskapsrådet and other foundations, e.g. Riksbankens jubileumsfond (although it is clear that the competition is very hard) and to enlarge the funding from some current sources in particular MISTRA.

COMMENTS TO THE IIIIE RESEARCH SELF-EVALUATION 2014, BY THE CRITICAL FRIEND SUSSE GEORG

IIIIE viewed from the other side of Øresund

Lena Neij has asked me to, as a critical friend, to assess IIIIE's strengths and weaknesses based on my reading of IIIIE's self-evaluation (draft 18.2.14). Although this task sounds relatively straightforward, reading the report has also generated many questions; some of which will, hopefully, be productive for IIIIE's further discussion. As a critical friend I have read the report according to a Danish proverb – as 'the devil reads the Bible'.

MAIN CHALLENGES

Developing a distinct research profile appears to be one of the Institute's main challenges. The aim of IIIIE's research is to "advance strategies towards sustainable solutions" (p. 1). However promising this may sound, it is also slightly enigmatic as it gives rise to three questions that the text does not address: Solutions to what? Strategies, for whom? And is advancing such strategies what is to be expected of a research institute? The issue of developing a better *understanding* of what makes sustainable solutions possible remains implicit. Accordingly, one could counter that the role of IIIIE is to pursue research that can provide new insights and knowledge that can support the development of sustainable solutions. Although this can be interpreted as quibbling about the wording, it could also be indicative of a deeper skisma regarding the Institute's role, as indicated by the observation that the Institute has reputation of being like a consultancy (mentioned in the SWOT).

The scope and focus of IIIIE's research centers around three themes related to advancing sustainable solutions within the realm of (i) consumption and lifestyles (ii) cities and regions and (iii) infrastructures and systems; all of which are very broad topics. It is, however, not clear how and why these areas have been given priority. There is a bit of a disjunction between this listing of research themes; the opening paragraph emphasizing IIIIE's work at the nexus of economy, industry, and the environment; and the emphasis given to business (in section 2.2). The descriptions of the research taking place within each theme needs further development, i.e. emphasizing how

IIIEE's research challenges, augments and extends existing research in these areas so as to highlight the originality of the Institute's research. Although there are some references to particular bodies of literature (e.g. EPR, bio-economy), it is not clear how IIIEE's research contributes to the theoretical developments in each of these areas. Moreover, it is not clear if there is a critical mass of researchers within each theme.

However, I really think that this section misses an opportunity in specifying IIIEE's 'unique selling point' by positing that research into complex environmental challenges is "by nature interdisciplinary". Although complex environmental challenges might *call* for interdisciplinary research, this does just come about 'naturally'. It takes a dedicated and sustained effort, and IIIEE has a 'history' of doing so! Moreover, most universities tend to have a disciplinary take on these issues, e.g. environmental economics, environmental history, environmental sociology and so on. In light of the increasing competition from other departments at Lund University and other Swedish Universities, emphasizing the interdisciplinarity of IIIEE appears to be a selling point. There are other interdisciplinary research centers (e.g. Stockholm Resilience Center, DIST, many centres in the UK, etc.), so more attention should be given to developing and describing IIIEE's unique profile when it comes to interdisciplinarity. As I see it, the 'unique selling point/profile' is not a topical one. After all, there are many research centres focusing on the research themes mentioned. It may be a disciplinary one, i.e. based on a particular set of disciplines, but this is not quite clear from the description, which disciplines are invoked and which of these are the 'core' disciplines (there is some indication of this in table 9, p. 18). And it may be a methodical one, i.e. a matter of your approach, i.e. participatory, collaborative, seeking to foster development *with* industry, ngos, government agencies, etc. Regardless, it needs to be described (and presumably debated) in more detail.

The self-assessment report documents a change in staffing: there has been a marked increase in the number of faculty from 2002-07 and this number has stabilized at approximately the same level in 2012, 12.5 FTE, balanced between PhDs and faculty. It is also a productive institute. There has been a shift from internal to external funding and the Institute appears to be relatively successful in attracting external funding. Although the ability to raise large amounts of external funding is indicative of the relevance and quality of the Institute's research, it is also suggestive of a challenge – being grant or project-driven may make it difficult to develop a distinct research profile. Moreover, judging from Table 2, there is a large number of PhDs that have not completed their dissertations! This should give cause for concern. It begs the question of what characterizes the research environment for the PhD students

The Analysis section presents a quantitative-structural perspective of the Institute and provides some important backdrop facts, but does not help much in understanding the demographics and dynamics of organizational life at the Institute that will influence how the strengths/weaknesses can be addressed. However, IIIEE – like most departments in the European academy nowadays – appears to be in a phase of transition; in the midst of a process trying to get at grips with its future mode of operation and direction.

THE SWOT ANALYSIS (APPENDIX 1)

The Institute's greatest **strength** is its interdisciplinarity and close inter-action with business and other societal partners. More should be done to establish IIIEE's unique interdisciplinary profile particularly in light of the competition from disciplinary domains and other interdisciplinary research centers. It would be interesting to discuss which research milieus the faculty sees as 'role models' and as competitors, and why this is the case. Innovative research methods and approaches are mentioned as strengths, but it is not very clear from the report what this entails, and how the researchers have developed and applied these. In other words, research methods and approaches could perhaps be turned into a major strength.

The issue of the Institute's strength is, however, also linked to some of the identified **weaknesses** regarding vague research profile/identity, visibility and funding. Strengthening research organization could also be a means to this end. However, whether this should be accomplished by establishing a more formal (as opposed to informal and vague mentioned in the list of weaknesses) structure is not at all clear and calls for further debate. The size of the institute is also an issue. The limited number of senior faculty introduces a certain vulnerability with respect to having sufficient resources to access external funding.

There are two **threats**, which should be subject to further consideration as they impinge upon and condition the way in which IIIEE challenges can be met. One is linked to IIIEE's research profile and reputation and the other has to do with the faculty's limited resources. *Reputation* is not something that is easily or swiftly built, and certainly not by better brochures or new web pages, although these are certainly important tools. Having a reputation as a consultancy is, of course, problematic in a university-setting, but it is not clear from the report who/what is

helping to create this image, and one could question if this couldn't be turned into an advantage? However, for this to be the case I think it is important to have a few "victories" or success stories that show how insights from consultancy (whatever that might be) feed into and add to on-going research debates. Although the publication data provides a quantitative indicator of this, more qualitative accounts may serve this purpose more aptly. *Time* is always an issue; there is never enough of it to go around. The tension between time dedicated to research, teaching and grant applications is certainly one that most university academics face. It is a managerial issue of how the Institute best uses its scarce resources that presumably needs to be addressed. The Institute can, in some respects, be likened to a "Garbage Can" (Cohen, March & Olsen 1972) in the sense that it resembles a loosely coupled system where individual autonomy is great, and where the unpredictable intersections of problems, solutions, individuals, etc, is provided great leeway. The 'drawback' of this may, however, be that goals and ambitions remain implicit and underspecified.

In sum, IIIIEE faces – like many other university departments – a situation where more and more emphasis is given to KPIs (e.g. number of publications, citations, impact factors etc.). For the Institute, success will be a matter of developing and keeping personnel with a strong competence in scientific writing, fundraising, building strong research groups, and other things measured. Promotion and recruitment policies take on a special significance in such a situation. Every new employment of an associate or full professor is a strategic choice. It is not possible to assess how much leeway the Institute has in this regard.

Appendix G: Swot Analyses

IIIEE Research - Strengths	IIIEE Research - Weaknesses
<ul style="list-style-type: none"> • IIIEE is part of Lund University • IIIEE conducts interdisciplinary research • IIIEE is engaged in international collaboration • IIIEE staff is international • IIIEE research is of relevance to business and societal partners • IIIEE researchers participate in high-level scientific assignments • IIIEE researchers develops and apply innovative research methods and approaches • IIIEE research is linked to educational activities at the IIIEE 	<ul style="list-style-type: none"> • IIIEE research identity has been vague and impacts unclear • IIIEE research has had low visibility • IIIEE research depends (fully) on external funding • IIIEE research has limited cooperation with industry (industry-funded research) • Research quality could be improved and more scientific papers could be published • Research organization is informal and vague
IIIEE Research - Opportunities	IIIEE Research - Threats
<ul style="list-style-type: none"> • IIIEE perceives increasing interest in “sustainability” research (from funding agencies); • IIIEE perceives increasing interest in “interdisciplinary” research (from funding agencies); • IIIEE perceives increasing interest in “transdisciplinary” research (from funding agencies); • IIIEE perceives increasing interest in sustainability related to economics and social sciences (from funding agencies); • IIIEE perceives that we can serve as a platform for research cooperation within LU (e.g. Urban Arena); • IIIEE perceives that new forms of spreading scholarly knowledge are emerging (blogs, etc.). • IIIEE could utilize our international networks better 	<ul style="list-style-type: none"> • IIIEE perceives increasing in competition with other universities (also within LU); • IIIEE perceives increasing competition with Institutes in Sweden (SP, etc.); • IIIEE perceives that standard evaluations of academic quality do not support interdisciplinary approaches; • IIIEE perceives a risk that some of the IIIEE research activities can be seen as consultancy; • IIIEE perceives a tension for researchers between education and research (time allocation).

IIIEE PhD education - Strengths	IIIEE PhD education - Weaknesses
<ul style="list-style-type: none"> • As PHD student at the IIIEE we work with applied research and we have clear directions in terms of outcome and goals • We benefit from an interdisciplinary working environment • Our research is of practical relevance • PhD students benefit from the article-based thesis work for future career • The interdisciplinary and applied nature of research at the IIIEE provides opportunities for career progression in different arenas, both within and outside academia 	<ul style="list-style-type: none"> • PhD research is often externally-funded and project-based, which limits freedom and constitutes a source of dependence • There is a lack of focus and specialization of research at the IIIEE (interdisciplinary also produces variety) • There is a lack of disciplinary academic tradition at the IIIEE (no harmonized theoretical and methodological approach) and an associated lack of academic discussion within the organisation • Felt distance to rest of Lund University • There is a lack of undergraduate teaching opportunities for PhD students • Lack of exchange with other academic environments
IIIEE PhD education - Opportunities	IIIEE PhD education - Threats
<ul style="list-style-type: none"> • A higher involvement of PhD students in teaching will offer new skills to PhD students • Serving as a platform for national and international collaboration, the PhD program could provide a source of new inspiration and exchange for PhD students (facilitate exchange/collaboration) • Creating a more clearly defined PhD program with clear structure (courses, collaborations, exchange among PhD students, skill development, etc.) will result in a reduced feeling of uncertainty among PhD students • An increased need for strategic solutions among policy-makers and business will offer future fields of research and expertise for the PhD students at IIIEE • Increased prevalence of similar interdisciplinary, applied research environments with which we can share knowledge • Support in the IIIEE Board and management for the academic strengthening of the IIIEE PhD programme • IIIEE could utilize our international networks better 	<ul style="list-style-type: none"> • Uncertain funding makes it difficult to do long-term planning and commitment for the PhD program • The project based funding can result in tension between PhD research and project obligations • A continued dominance of disciplinary research could harm career opportunities for the PhD students at IIIEE (i.e. if interdisciplinary does not become as dominant a practice in academia as often predicted, researchers with a strong interdisciplinary background might lack the disciplinary focus necessary to get employment/funding/academic reputation necessary for a successful career within academia)

Appendix H: Concluding SWOT Analysis

In 2013 SWOT analysis on IIIEE research and IIIEE PhD education was developed by the IIIEE staff, see Appendix G. These have been summarized and further developed based on the self-evaluation reported above and comments provided by the Critical Friends

Strengths

- The relevance of IIIEE research is high;
- IIIEE conducts unique interdisciplinary research;
- IIIEE research is highly international and performs highly in international collaboration;
- IIIEE research is performed in collaboration with business and societal partners;
- IIIEE is successful in attracting external funding;
- IIIEE research is of high quality;
- IIIEE researchers participate in high-level scientific assignments;
- IIIEE is part of Lund University and collaborate with several LU departments;
- IIIEE serve as a platform for research cooperation within LU (e.g. Urban Arena);
- IIIEE research is linked to educational activities at the IIIEE (involve PhD students);
- The interdisciplinary and applied nature of research at the IIIEE provides opportunities for career progression in different arenas, both within and outside academia.

Weaknesses:

- The IIIEE is a small institute covering many research topics;
- The IIIEE research is fragile and relies on a limited number of senior researchers (professors);
- The workload of many senior researchers is huge as they are active in many activities - administration, education, research, commissioned research, fundraising, high-level assignments, media etc.. Moreover, a limited number of researchers are (very) active in all these activities;
- IIIEE research identity is vague and the research profile broad (but being grant or project driven may make it difficult to develop distinct research profile):
- The visibility of the IIIEE research is low;
- The societal impact of the IIIEE research is unclear and can be better described in cases (i.e. success stories)
- IIIEE research depends (fully) on external funding.

Opportunities:

- Increasing interest in "sustainability" research (from funding agencies);
- Increasing interest in "interdisciplinary" research (from funding agencies);
- Increasing interest in "transdisciplinary" research (from funding agencies);
- New forms of spreading scholarly knowledge are emerging (blogs, etc.).

Threats:

- IIIEE perceives increasing in competition with other universities (also within LU);
- IIIEE perceives increasing competition with Institutes in Sweden (SP, etc.);
- IIIEE perceives that standard evaluations of academic quality do not support interdisciplinary approaches;
- Uncertain external funding makes recruiting difficult.



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