

FULL REPORT: THE INAUGURAL 2017 ARISE SYMPOSIUM

BY ANGELE REINDERS & MELANIE BRAAMHAAR



INTRODUCTION

ARISE, a new knowledge network at the University of Twente which focuses on sustainable innovations for energy-efficient smart cities, was founded exactly one year ago. To celebrate its first birthday, Arise organized a symposium on the topics of Sustainable Energy and Circular Economy. The symposium aimed to be a highly interactive event for both seasoned experts as well as entry-level professionals and students. The symposium provided a unique opportunity to meet, share and discuss sustainability and energy related developments in a timely and influential forum in the field of design research for sustainability and energy.

The symposium's program was divided into two program lines, one about Sustainable Energy, the other about the Circular Economy. Each program line presented excellent speakers from academia, governmental organizations and business, and was supported by creative workshops according to the Science2Design4Society (S2D4S) method to pinpoint and further explore the important problems to be solved in the field of sustainability and energy.



GEERT DE WULF

DEAN OF THE FACULTY OF ENGINEERING TECHNOLOGY OF UNIVERSITY OF TWENTE

Prof. Geert Dewulf is Professor of Planning and Development and Head of the Department of Construction Management and Engineering at the University of Twente, the Netherlands. He is also a member of the Management Board of the Faculty of Engineering. Before he joined Twente University he was senior consultant at the Netherlands Organisation of Applied Scientific Research and assistant professor in Delft University of Technology. He holds a PhD in social science from the University of Utrecht. He was a Visiting Fellow at Harvard University.

Geert started his opening with an announcement of NASA in today's news: 2016 was the hottest year on record globally. This fact shows the importance of research in the field of energy efficiency as ARISE proposes. Geert is therefore happy to host the ARISE network within the ET faculty and the choice of DesignLab as the location for the event. The Lab brings forward what UT, ET & ARISE stand for: an open multi stakeholder research community with a focus on design driven solutions.



Geert answers questions from the audience following his Keynote presentation.

JOOST KUIJPER

ECONOMY STRATEGIST AT PROVINCE OF OVERIJSSSEL

Mr. Joost Kuijper is Strategic Policy Advisor in the field of Regional Economy and Culture for the Province of Overijssel.

Joost introduced the regional perspective of the New Energy & Circular Economy themes to the audience. Since the government changes every 4 years, it takes time for governmental bodies as the Province to adapt to changes in society. The theme of Circular Economy is put on the agenda of the deputies, but an actual working plan linked to it will be the responsibility of the next cabinet. However, the Province of Overijssel is ahead of the national ambitions on renewable energy (20/16% towards the year 2023). At province level, the energy reduction measures (like pv-panels on roofs) are most popular, since they provide efficient, direct revenues within the 4 years term of politicians.

The New Energy Programme Overijssel is planned to be approved by the end of February. This programme offers a wide variety of funding/collaboration opportunities for the attendants of the symposium (and beyond). This programme was designed by 7 core partners of the province: municipalities, companies and the 'Bio-energy cluster East-Netherlands' (BEON), in which also academic partners are represented.



Official logo of the Province of Overijssel.



ANGÈLE REINDERS

ARISE-ING URBAN INNOVATIONS IN SUSTAINABILITY AND ENERGY

ASSOCIATE PROFESSOR OF ENERGY EFFICIENT DESIGN AT UT AND
FOUNDER OF ARISE

Angèle Reinders initiated the knowledge center ARISE at University of Twente in 2015. Her daily research focuses on product development and system design with sustainable energy technologies in the built environment. A core theme is achieving a better integration of photovoltaic (PV) solar energy, energy-efficient technologies and other sustainable energy technologies in systems, products and buildings by new design approaches and simulation tools, as well as by combining technical monitoring with user studies. Recently she started a new research line on user interactions with smart energy products and services in residential smart grid pilots. She has published about 100 papers, edited two books, among others 'The Power of Design- Product Innovation in Sustainable Energy Technologies', and is a co-founding editor of the IEEE Journal of Photovoltaics. She has a vast international experience and stayed at Fraunhofer ISE (Germany), World Bank (US), ENEA (Italy), in Indonesia and at the Centre for Urban Energy (Canada) for her research.

Angèle introduced the ARISE network to the audience. She explained about the motivations to set up ARISE. Also the members, the objectives and activities of ARISE were presented. Energy and sustainability are topics that are highly positioned on the past and the present agendas of politics and research funding organizations in the Netherlands and in the world. Naturally since we don't have a planet B, we all understand why we need to protect our environment, in particular for our future generations, but still though, the deployment of fossil fuels dominates energy provision in our society. This is a context which can't be ignored as a challenge and an opportunity at the same time. Therefore we like to look for alternatives. This will be a challenge since rapid urbanization will lead to an increasing concentration of people living in cities in the nearby future. It is vital to focus on the built environment because this is the place where most of the human activities and related energy consumption takes place. In fact, according to the IEA 40 per cent of the global primary energy consumption takes place in the built environment. Moreover, the global energy demand of buildings is projected to grow by an additional 30 per cent by 2035. Hence, energy efficiency and use of sustainable energy in the built environment will be crucial to achieve the EU-targets for 2020 comprising 20 per cent lower greenhouse gas emissions than 1990, 20 per cent energy from renewables and 20 per cent increase in energy efficiency.

These ambitions have become even more important in the framework of the climate conference COP, which was successfully completed in 2015 with international commitments to limit global CO₂ emissions to relatively safe levels leading to a global warming of just 2 °C with an aspiration of 1.5 °C. These goals will only be achievable by a large scale implementation of low emission technologies.



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Angèle explaining about ARISE during the Keynote session of the Symposium in the DesignLab.

Logically, more sustainable and energy-efficient energy solutions should be locally embedded in an urban context; namely at the location where people live, work and commute. These three aspects: living, working and transportation will be the core directions to the research and educational activities of ARISE (Advanced Research on urban Innovations in Sustainability and Energy).

ARISE'S RESEARCH FOCUSES ON THE DEVELOPMENT AND ADOPTION OF SUSTAINABLE INNOVATIONS FOR ENERGY-EFFICIENT SMART CITIES. THIS IS RESEARCH THAT RESULTS IN THE BEST INTEGRATED SOLUTIONS FOR SUSTAINABILITY AND ENERGY-EFFICIENCY IN THE CONTEXT OF PRODUCTS, BUILDINGS AND LOCAL INFRASTRUCTURES THAT SUPPORT LIVING, WORKING AND TRANSPORTATION IN THE BUILT ENVIRONMENT.

MISSION STATEMENT OF ARISE

Research on the development and implementation of innovations for sustainable energy-efficient smart cities

ARISE'S POSITION AT THE UNIVERSITY OF TWENTE

ARISE is positioned in the Faculty of Engineering Technology of University of Twente where it has a profound basis in science-based engineering and design-driven research. The ARISE research center brings together specialists who focus on translation of findings from fundamental research to applications, who develop methods and tools to find the best integrated solutions and who evaluate existing and new solutions by prototyping, measurements and simulations. ARISE is embedded in university-wide programs and maintains connections with various affiliated groups at University of Twente and elsewhere.

These objectives are achieved by regular meetings with members, a website for external communications, collaborative acquisition of projects, education and student projects. ARISE's website can be accessed by utwente.nl/ctw/arise and arisetgether.nl where you can find background information, objectives and the mission statement. It shows members, their experiences, ongoing projects and their publications. Additionally the website has a section with a news feed and interactive global map with ARISE projects in various countries. Other communication from ARISE at present a LinkedIn Group is available for ARISE and soon a forum for discussions will be launched at the website of ARISE.

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OBJECTIVES OF ARISE

ARISE's objectives are related to knowledge generation and dissemination, networking and education according to the list of core objectives shown below:

- ◆ Execution of research, design and educational activities which fit to the mission statement.
- ◆ Creation of a community of sustainability and energy specialists to share knowledge.
- ◆ Dissemination of activities, research results and designs to a wider audience.
- ◆ Collaboration with external parties by developing new projects.
- ◆ Participation in European or nationally funded projects
Realization of international exchange with students and specialists.



GERRIT BRUGGEMAN

MY JOURNEY FROM CRADLE TO CRADLE

MANAGING PARTNER AT RTB STRATEGY & CONCEPT DEVELOPMENT

Gerrit Bruggeman is Managing Partner of RTB, orchestrating the transition toward sustainability for organizations and their stakeholders. Gerrit has extensive international experience as CEO, board member and board room advisor across many industries, especially in retail, fashion and home furnishing. As CEO of Royal Auping, a Dutch bedding firm, Gerrit acquainted himself with Cradle To Cradle, a concept he immediately embraced and introduced in the company. He has become a real fan of Cradle to Cradle, promoting the concept with customers and during speaking engagements.



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Gerrit explaining his own journey during the Keynote session of the Symposium in the DesignLab.

GERRIT IS PRACTICING THE CRADLE-TO-CRADLE PRINCIPLES IN ALL TYPES OF COMPANIES OVER THE PAST DECADES. HE BELIEFS IN ABUNDANCE: THERE IS ENOUGH FOR EVERYBODY IF ONLY THE WORLD AND ITS RESOURCES ARE RESPECTED IN EVERY POSSIBLE WAY.

Design is the key aspect of sustainability, since designers decide upon materials and construction.

Gerrit has applied the cradle-to-cradle business philosophy as member of the board to Auping, The Valley and ECOR. He states that only real breakthroughs, real renewal and true connection to the principles of sustainable entrepreneurship make it work.

At Auping Gerrit managed to convince the whole company including the supply chain partners to apply for the cradle-to-cradle certification. The company managed to obtain this certificate within 9 months.

The Valley, a business park, near Schiphol Airport has the ambition to become the first circular hub in the world: a unique place where circular ideas, technologies, financing structures and business models are being developed. The concept of the Valley is already a huge success economically, ecologically and socially.

ECOR is a US based company that puts any biological waste into products, relevant for the producer of the waste, at the premises of the producer. It is therefore 100% cradle-to-cradle, not only in its production processes but also in its products.

DAPHNE KARREMAN

INTRODUCTION TO SCIENCE2DESIGN4SOCIETY METHOD

RESEARCHER AND WORKSHOP SUPERVISOR AT DESIGN LAB AT
UNIVERSITY OF TWENTE

Daphne Karreman studied Industrial Design Engineering at Delft University of Technology. In 2010 she received her MSc in two of the master programs of Industrial Design: Design for Interaction and Integrated Product Design. After her study she did some freelance design work, until she started her PhD at the Human Media Interaction (HMI) group at the University of Twente in 2012. Her research is about the development of personality and behavior of a Fun Robotic Outdoor Guide to have satisfying human-robot interaction (frogrobot.eu). At this moment she works as a postdoc on the Science2Design4Society method.

Daphne introduced the Science2Design4Society method to the audience. This method was used during the workshops that were planned in the afternoon to develop ideas about sustainability and design in urban environments.



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Daphne (left) leading the workshop portion of the Symposium.

GIANLUCA FULLI

SMART GRIDS: YES IN MY BACK YARD!

DEPUTY HEAD OF THE ENERGY SECURITY, DISTRIBUTION AND MARKETS UNIT
AT THE EUROPEAN COMMISSION, JOINT RESEARCH CENTRE

Gianluca Fulli has more than 16 year-experience in power system/smart grid policies, regulation and research, with special focus on electricity grids planning, operations and technologies. He previously worked with: the Italian transmission system operator (GRTN/TERNA), where he was responsible for cross-border interconnectors planning and new generation connection; the UK gas & electricity company (NGT), on renewable integration studies; and IBM, on software for distributed devices management. He holds a university degree (La Sapienza University, Rome) and a PhD (Politecnico di Torino), both in electrical engineering. He co-authored more than 70 scientific publications and he is involved in several EU/international projects and initiatives on smart/power grids, including those linked with the Energy Infrastructure Package (Projects of Common Interest), the Trans-European Networks for Energy, Horizon2020 and the European Strategic Energy Technology Plan.



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Gianluca (left) answers a question following his presentation on smart grid technology.



LAURA FRANCO GARCIA & MARTIN TOXOPEUS

THE KEYWORDS OF CIRCULAR ECONOMY: SYSTEM THINKING, INNOVATION AND COLLABORATION

ASSISTANT PROFESSOR AT UT

María-Laura Franco-García works for CSTM at UT. She holds an Environmental Engineer (UAM, Mexico), a Master's degree on "Management & Treatment of Solid Wastes" (INSA Lyon, France) and a PhD on "Environmental Chemistry" (Université Claude Bernard Lyon I, France). She applied Nano Sciences to water treatment as post-doctorate (Hokkaido University, Japan). She is board member of "Greening of Industry Network (GIN). GIN organizes international meetings to enabling interaction for collaboration among different stakeholders. "Circular Economy" was the core of GIN 2015 conference.

Laura provided a profound background on the status of Circular Economy practices in The Netherlands. Her research comprises the question: What are the CE enablers of Dutch leading companies?

PRELIMINARY OUTCOMES ARE IN THE FIELD OF MINDSET CHANGE OF PRODUCERS AND CUSTOMERS, CAPACITY BUILDING IN COMPANIES AND THE USE OF FRAMEWORKS LIKE LIFECYCLE THINKING FROM PRODUCT DESIGN AND CRADLE-TO-CRADLE PRINCIPLES.

Marten Toxopeus shared info and outputs on the EFRO-project CIRCLES where he is involved in. The project provides the establishment of a one-stop-shop for entrepreneurs, students and municipalities active in the field of Circular Economy to provide them with tools to investigate and stimulate circular production processes.



– KEY QUESTIONS:

Laura asked the attendants to discuss the following questions during the workshop:

- ◆ What are the needed conditions to enable collaborative projects that embed CE tenets?
- ◆ How to boost the transition from linear to circular economy?
- ◆ Why shouldn't you be involved in the CE initiatives?
- ◆ How is your company organized under the CE principles?

ALBERT MOLDERINK

SUSTAINABLE ENERGY IN PRACTICE – WHAT DOES THAT MEAN FOR YOUR EVERYDAY LIFE?

RESEARCHER IPSUM ENERGY AND ASSISTANT PROFESSOR AT UT

Albert Molderink received his B.Sc. and M.Sc. degree in Computer Science from the University of Twente in respectively 2004 and 2007. When he completed his study he started working towards a Ph.D. degree at the University of Twente under supervision of Prof. dr. ir. G.J.M. Smit and Prof. ir. J.L. Hurink. Now he is working at Ipsum as researcher.

IPSUM DEVELOPS A SERVICE TO DISAGGREGATE ENERGY CONSUMPTION MEASURED USING SMART METERS TO GIVE DETAILED INSIGHT ON A DEVICE LEVEL AND FEEDBACK TO SAVE ENERGY.

Next to that he is working as an assistant professor in a research group that investigates the possibilities of increasing energy efficiency using embedded control, mainly via optimization and control algorithms. His research focus is on algorithms to optimize energy streams within a house.

Albert gave a short introduction in the basic of our current energy supply system and based on this what the challenges we face due to the energy transition. Next, he discussed what the impact on the grid is, what the options are to overcome these challenges and especially what the consequences are for the consumers and the way they think about energy (or start thinking about energy).



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Albert (right) goes into detail on the impact of smart grids.

DANIËL POOLEN

HOW TO STOP ONE OF THE BIGGEST SOURCES OF PLASTIC SOUP?

CHIEF PLASTIC OFFICER AT PLASTIC MINING COOPERATION

As a kid *Captain Planet* was one of his favorite cartoons; a superhero fighting villains who are polluting Mother Nature. Now, two decades later, Daniël Poolen is still inspired by this cartoon. Graduated as engineer on implementing sustainability, he went to the industry influencing most people: television. After several years he produced and presented several green television programs, increasing awareness and educating people on all kinds of environmental problems. But, one specific environmental problem has got his special attention: *The Plastic Soup*. Combining his love for engineering and materials, he worked on several projects past years to fight plastic pollution. Now he joined the *Plastic Soup Enterprise* and is working on a solution to fight the worldwide problem with plastic pollution.

Daniël Poolen started his convincing speech with some impressive numbers:

5 TO 13 MILLION TONS OF PLASTIC LEAK INTO THE OCEANS EVERY YEAR. A LOT OF THE PLASTIC IS THEN CONSUMED BY ANIMALS, SUCH AS MUSSELS AND FISH. WHEN WE CONSUME THEM, WE INGEST THEIR PLASTICS, WHICH IS NOT GOOD FOR US.

The main cause of this plastic soup is bad waste management. Our current disposal methods are landfilling, burning and dumping of plastics, which can become litter, and consequently end up in the oceans. That is not necessary. Plastic could also be recycled relatively easy, cheap and at a small scale. The Plastic Mining Cooperation, the company Daniel is working for, has therefore developed a total recycle solution, in particular suitable for (small) islands. The concept comprises education to the local population and companies on the potentials of recycling, and small-scale recycling machines. They tested their concept at the island of Bonaire and the results of this small scale recycle approach were promising.

All four lectures were followed by interactive Science2Design4Society workshops, moderated by Daphne Karreman and Frank Kresin of the DesignLab.

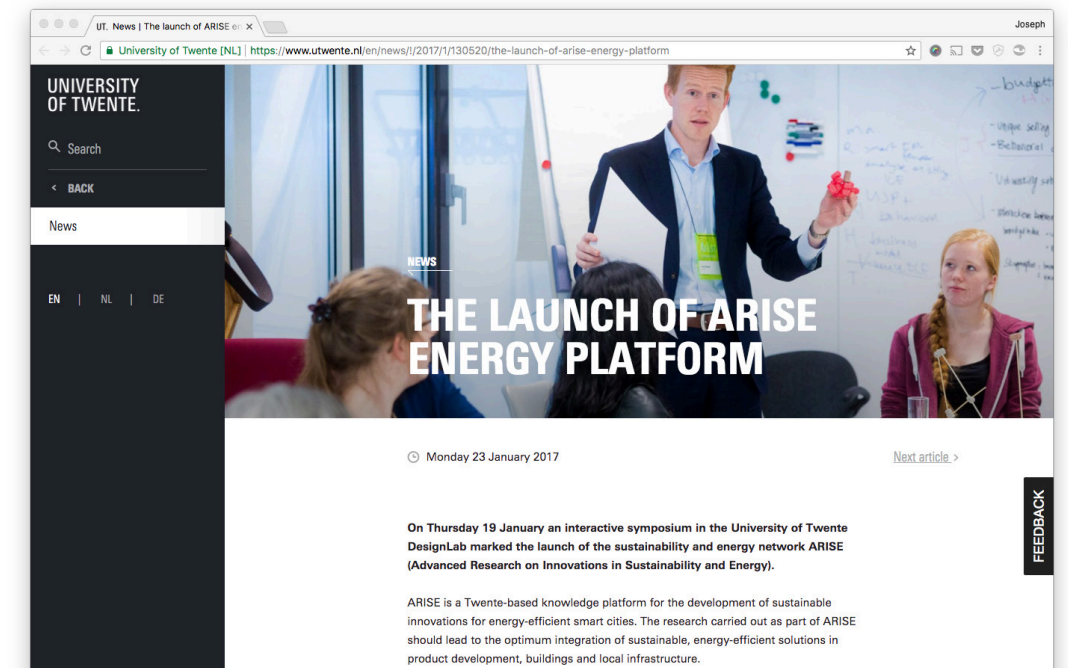
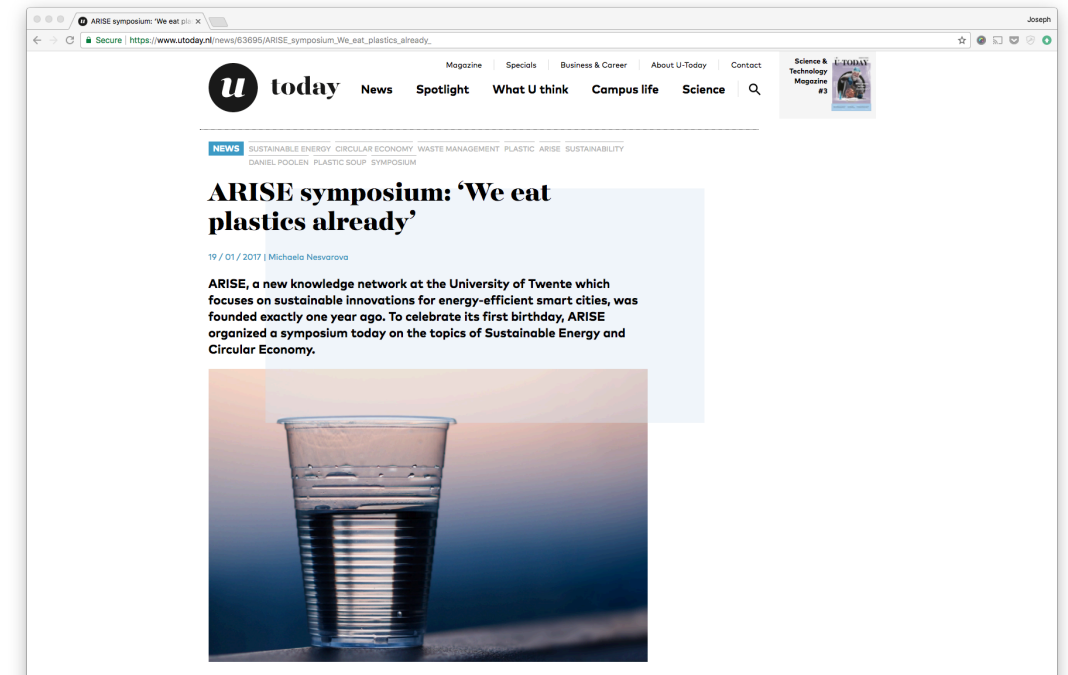


KEY QUESTIONS

The key questions Daniël addressed in the workshop after his lecture were as follows:

- ◆ How can we make the plastic separation easier? (We use different types of plastic for different applications. One of the hardest parts in plastic recycling is separating the different types.)
- ◆ How can we make the process of converting plastic waste to a resource more energy efficient? (Recycling machinery uses a lot of energy. Grinding, washing and drying 200 kg of plastic per hour uses up to 75 kW.)
- ◆ How can we monitor whether our plan has any effect on the ocean? (Our goal is to stop plastic waste from getting into our ocean.)

IN THE NEWS



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