PROGRAMME

8:30	**Registration and Coffee**
9:00	**Introduction by chair of the Day** (Louise Vet, Netherlands Institute of Ecology)
9:15	**Sustainable behaviour: A psychological perspective** (Janet Swim, Penn State University, USA)
10:00	**Chemistry for sustainable innovation. Fuels and chemicals from biomass** (Hans de Vries, Groningen University)
10:45	**Coffee**
11:15	**Energy-Which solutions are there to solve our energy problem** (Roland Schmehl, Delft University of Technology)
12:00	**Transportation Technology; Sustainably from A to B** (Hans Nijland, Planbureau voor de Leefomgeving)
12:45	**Lunch**
13:45	**Geology - Resources; How can we solve the issue of resource depletion?** (Salomon Kroonenberg, Delft University of Technology)
14:30	**Sustainable design and the Cradle-to-Cradle concept** (Michael Braungart, Erasmus University Rotterdam, Leuphana University Lüneburg (GER) and Twente University)
15:15	**Coffee**
15:45	**Plenary discussion**
16:30	**Synthesis and Closure**
16:45	**PE&RC Publication Award**
17:00	**Drinks**
18:00	**Dinner**

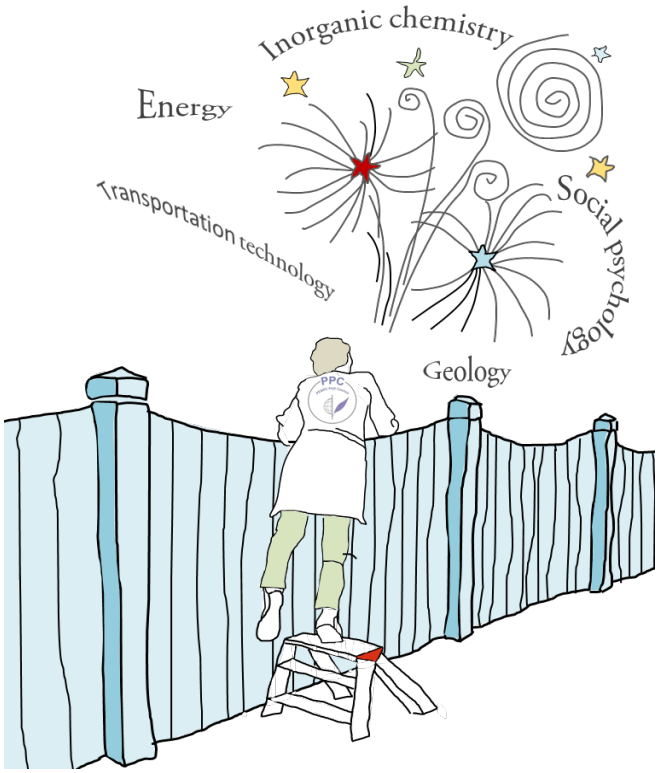
PE&RC-Day 2011

Innovation for Sustainability

What are the neighbours doing?

Thursday 20 October 2011

(Hof van Wageningen)



ABSTRACTS

Sustainable behaviour: A psychological perspective

(Janet Swim, Penn State University, USA)

Three ways that psychologists study sustainable behaviour will be described and illustrated. First, psychologists analyse characteristics of behaviour and classifications of behaviour. Behaviour vary not only in terms of their contribution to, for instance, climate change, but also in terms of their functions and how they are perceived. Behavioural information can influence which behaviour change agents may choose to target and can help understand behavioural specific barriers that need to be overcome in order to achieve or sustain behavioural change. Second, psychologists analyse psychological predictors of engagement in sustainable behaviour, while recognizing the social context in which behaviour occur. These predictors include differences among individuals (e.g., differences in values) and psychological processes (e.g., affect) that influence behaviour. Third, psychologists encourage individuals to engage in sustainable behaviour. The encouragement can be in the form of creating contexts that increase the likelihood of behavioural change or empowering individuals to overcome barriers to behaviour.

Chemistry for sustainable innovation. Fuels and chemicals from biomass

(Hans de Vries, Groningen University)

The looming shortage of oil has triggered a search for alternative sources of fuels and chemicals. A number of solutions present themselves for the energy shortage, one of which is the use of biomass. A new approach is to focus on the use of lignocellulose as a raw material. Lignocellulose is abundantly available and is underutilised. Another approach is the conversion of biomass into pyrolysis oil or biocrude. These two raw materials can be converted using aqueous phase reforming into a mixture of carbon monoxide and hydrogen. This mixture can be converted either into methanol or into a mixture of olefins. Both methanol and the olefin mixture can function as the start of a fuel or a bulk chemicals plant. A more direct approach is the treatment of lignocellulose with dilute sulphuric acid at high temperatures forming levulinic acid and formic acid. Levulinic acid has been touted as one of the platform chemicals that can serve as raw material for a host of products in the new bio-based chemical industry. Another example is HMF, which can be made in a single step from fructose and has been proposed as a drop-in replacement for phtalic acid in PET (Soda bottles) and plasticisers. We have been able to convert HMF into caprolactam, the raw material for Nylon-6 in just 4 chemical steps in high yield

Energy-Which solutions are there to solve our energy problem

(Roland Schmehl, Delft University of Technology)

Wind at higher altitude is a major source of renewable energy. However, this potential lies far beyond the reach of conventional wind energy systems using rigid tower structures. One of the possible solutions to capture wind energy at altitudes above 200 m is the use of kite power systems. The kite power research group of Delft University of Technology is developing a system based on a pumping cycle. The current technology demonstrator is designed for 20 kW mechanical reel-out power. It uses a single cable to connect the kite to the ground station and implements the steering of the kite in a control unit suspended below the kite. Systematic testing has confirmed that the periodic pumping concept can be implemented efficiently with a relatively small energy loss in the reel-in phase of the kite. Attractive deployment scenarios are compact mobile power units for remote areas and disaster areas as well as offshore wind parks with a much lower environmental impact.

Transportation Technology; Sustainably from A to B

(Hans Nijland, Planbureau voor de Leefomgeving)

Transport enables us to reach places and undertake activities. Transport is therefore indispensable for our economy. At the same time, side-effects of transport like air pollution, noise, traffic accidents and the emission of greenhouse gases undermine our welfare. In his presentation, Hans Nijland will treat the issue of these side-effects: how big are they and what are options to reduce them? Are innovative solutions at hand to solve these sustainability issues? Are technical innovations alone enough to solve the problem, or should we change our mobility patterns as well?

Geology - Resources; How can we solve the issue of resource depletion?

(Salomon Kroonenberg, Delft University of Technology)

Resources can be subdivided into two categories: renewable and non-renewable. The question is: how much time do we need for a resource to be renewable? Metals, such as copper, zinc, aluminum can be recycled by ourselves that is in our own hand. The only limitation is the cost of extraction. Other resources are less easily renewed, such as soil. Soil formation takes thousands of years, and soil erosion can severely hamper agricultural production. Fossil fuels are not only a source for energy, but also for polymers, medicines, cosmetics and many other materials of vital importance for humankind. Therefore we should restrict our use of fossil fuels for combustion, in order to leave enough for future generations. Forget CO2, it is the least of the problems caused by burning fossil fuels. Save energy, develop sustainable forms of energy production, preferably solar energy. If we can develop solar cells that absorb CO2 from the air and convert them into gasoline we have solved the problem, and those who wish so can close the carbon cycle at the atmospheric CO2 level of their preference.

Sustainable design and the Cradle-to-Cradle concept

(Michael Braungart, Erasmus University Rotterdam, Leuphana University Lüneburg (GER) and Twente University)

Cradle to Cradle® is a design concept guided by nature. With Cradle to Cradle®, as in nature, there is no such thing as waste. In nature all things are products of a metabolic process and useful for other processes. Products designed according to the Cradle to Cradle® design concept work exactly the same way. Therefore they are an important answer to the most urgent challenges of our times. They envisage their redesign into circular nutrient cycles in which value, once created, remains of worth to both man and nature. Materials can also rotate in technical nutrient cycles. Thinking in these new ways of design, every television set or every washing machine can be reborn as a new apparatus.