

Food 2 Waste 2 Food Seminar 2015 | June 23rd



"The Food 2 Waste 2 Food project is developing an innovative greenhouse system for saving energy and recycle nutrients from organic waste" - F2W2F team

The seminar will present the current results of the project and provide a productive meeting ground for agriculture entrepreneurs, environmental and technology researchers, waste management officials and other interested parties. There will be interactive sessions to promote collaborative learning and offer participants hands on experiences.



Patrick Zwaan (Guest speaker - Rabobank) Impact on the Horticultural Business

Pål Smits (CEO Lindum) H Impact on Waste Management Business

Piet Broekharst (LTO Glaskracht) Closing Summary



Anton Paardekooper (BBBLS) Greenhouse Energy & Climate Control

"Join us and help innovate the food production and waste management" - F2W2F team

Updates | Visit the F2W2F Seminar 2015 website



Information

Date:	Tuesday June 23rd
Time:	13:00 - 18:00
Location:	Rabobank, Sportlaan 10, 1421TE Uithoorn
Cost:	Free of charge - snacks included
Contact:	anton.paardekooper@bbbls.net

Registration

Press this link to register



Program overview

	Opening		
13:00	Intro - 80% Energy saving		
	Intro - F2W2F Cycle		
14:00	Greenhouse Energy & Climate Control	Cycling of Organic Waste & Nutrients	
15:00	Impact on Horticultural Business		
	Impact on Waste Management Business		
16:00	Closing		
	Gathering, informal drinks until 18:00		



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Food 2 Waste 2 Food Seminar 2015 | Tuesday June 23rd

PROGRAM DESCRIPTION

13:00



- Edgar Kampers Making food from waste is a solution to one of the biggest challenges of our times - the F2W2F

system is a disruptive technology that can change the global food production, reduce the carbon footprint and revise how we understand the value of our waste".



Intro - 80% Energy Saving - Anton Paardekooper

We have become very enthusiastic about our BBBLS insulated greenhouse and want to share

that with you. We have achieved high energy savings at our pilots in Norway and Poland. We like to tell you what we have achieved, how it works, how we got there, and what problems we have, how far we are now and what will be next!

Intro - F2W2F Cvcle



- Ketil Stoknes 🕂

How did we create this optimal cycle? How did we turn the waste into complete substrates

15:00

and fertilizers? What is the mass balance? Is it economically feasible? How does the approach influence a person's or tomato's ecological footprint?

14:00

Greenhouse Energy & Climate Control - Anton Paardekooper We like to share in more detail the way our experiences (both good and bad). With the soap bubble insulation, the energy consumption is reduced by 80% and seasons can be extended or shifted. How can we use the flexible greenhouse cover to have the required light- and heat transmission? How do we use heat from the sun and cold from the night to control the greenhouse climate? What are the differences in construction and greenhouse cover, what is the impact on the crop and yield?

system works, and share and discuss our

Cycling of Organic Waste & Nutrients - Ketil Stoknes

What are the physical, chemical and microbiological details of the journey of the food and green waste through pre-treatment, anaerobic digestion, aerobic conversion and conditioning, before uptake into crops? How to provide O₂ for the plant roots and the right nutritional composition when waste is the only input? Is the turnover from raw digestate to plant uptake fast enough for commercial needs? Published literature was discouraging, but our failures and corrections eventually lead to similar yields as the commercial control! We have termed the technique digeponics; here you get the details. Integrated mushroom culture has also been investigated; we serve you the naked facts!

> Impact on Horticultural Business - Patrick Zwaan Horticulture is facing strong challenges: energy costs are rising and with strong competition

prices and margins are low. Environmental footprint is considered high with heating, transport and storage. How can an insulated semi-closed greenhouse and integration with waste streams make the sector more profitable with lower environmental impact? With which technologies can we improve margins, can we produce closer to the market and will this make the sector more sustainable? We have invited an external speaker to answer these questions.

> Impact on Waste Management Business - Pål Smits 井 Sustainable waste treatment means going up the waste hierarchy from land-filling, through

energy recovery, to full material recycling. How can the waste industry serve agriculture, and what are the trends? Composting is an integral part of organic waste treatment, and the product has a growing demand. However, with biogas digestion we take it even a step further: it yields both fuel and a safe nutrient rich residue for production of crops. The key to success for the waste industry is to create high value from the waste – in fact the end of waste!

16:00

Closing Summary



- Piet Broekharst What challenges do we face within "Kas als Energiebron". the innovation program to stim-

ulate energy saving and sustainable energy in the greenhouse horticulture sector, and where will BBBLS fit in?

Program

	Opening	Edgar Kampers	
13:00 - 13:45	Intro - 80% Energy Saving Anton Paardekooper		
	Intro - F2W2F Cycle	Ketil Stoknes	
13:45 - 14:00	Coffee break - 15 min		
14:00 - 14:50	Cycling of Organic Waste & Nutrients Ketil Stoknes	Greenhouse Energy & Climate Control Anton Paardekooper	
14:50 - 15:00	Coffee break - 10 min		
15:00 - 15:25	Impact on Horticultural Business Patrick Zwaan		
15:25 - 15:50	Impact on Waste Management Business Pål Smits		
15:50 - 16:00	Coffee break - 10 min		
16:00 - 16:30	Closing Summary Piet Broekharst		
16:30 - 18:00	Gathering, informal drinks		





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Food 2 Waste 2 Food About the project



The Food 2 Waste 2 Food project is a European

partnership that has developed an innovative

greenhouse technology with the purpose of sus-

tainably feeding our cities all year round using up

to 80% less energy and water and with 95% re-

source recovery compared to conventional green-

house systems. This is realized by integrating food

waste treatment, biogas digestion and growing

fresh vegetables within an insulated semi-closed

greenhouse. BBBLS (partner) has developed an

innovative greenhouse using soap bubbles in a

"double layer roof" that insulates from outside

cold and heat and provides shade against the sun.

The technology has been successfully demon-

strated in Norway for the last two years. A second

version has recently been installed in Poland. The

next commercial scale versions will be built in Norway and the Netherlands in late 2015.

The Greenhouse System of the Future?







BBBLS Insulation

Rising energy prices and changing regulations are major threats for the profitability of the greenhouse industry. When adopting BBBLS insulation, commercial growers can cut 90% on heating costs and gain a 20% better margin, with investments that are equal to conventio-nal greenhouses. The design of the BBBLS greenhouses is based on existing com-

ponents and has been tested for several years. The BBBLS system has two main components: bubble insulation and heat storage. When needed a double layer roof with a cavity in



between is filled with soap bubbles providing insulation from outside cold and heat, and shade against the sun. Insulation goes up with a factor 10. When insulation is not required, the bubbles are removed to permit maximum light transmission. During the day humidity is reduced and heat is stored in buffers.



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BBBLS areenhouse



Food 2 Waste 2 Food About the project

Biogas Plant

verm

compost

Digester

mushroo

compost

sidue

reject

The F2W2F Cycle - processes waste into food

The process reduces waste treatment and disposal costs tremendously, because waste is turned into a raw material for fresh food production - mushrooms, lettuce and tomatoes have been grown with commercial scale yields. This leads to a major breakthrough in providing competitive food prices year round and creation of local jobs. Lindum (partner) mechanically pre-treats organic waste that is converted into biogas and digester residue. The biogas is used to produce electricity



F2W2F pilot in Norway

for lighting and CO2 for plant growth. The digester residue solids are converted into a growth substrate for plants, using earthworms and the addition of green waste compost. The liquid part becomes a nutrient solution, without the addition of chemicals.

garden

compost

Households

garde waste

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crop



nushroom

substrate

Green-

house

iquid

fertiliser

4

tioning

separation soap

bubble

nsulation

BBBLS

areenhouse

electricity

