

International Congress and Exhibition  
Environmental Technology & Renewable Energy

# PROGRAMME



Environmental Technology



Renewable Energy



ETAP Forum



Business Lounge

## Organisers



Lebensministerium - Federal Ministry of Agriculture, Forestry,  
Environment and Water Management  
[www.lebensministerium.at](http://www.lebensministerium.at)



ACV – Austria Center Vienna  
[www.acv.at](http://www.acv.at)



ICC – International Association for Cereal Science and Technology  
[www.icc.or.at](http://www.icc.or.at)



Eco World Styria  
[www.eco.at](http://www.eco.at)



ÖGUT – Austrian Society for Environment and Technology  
[www.oegut.at](http://www.oegut.at)



WKO – The Austrian Federal Economic Chamber  
[www.wko.at](http://www.wko.at)



Network Environmental Technology  
[www.netzwerk-umwelttechnik.at](http://www.netzwerk-umwelttechnik.at)



City of Vienna  
[www.wien.gv.at](http://www.wien.gv.at)

## Main Sponsors



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Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

International Association for Cereal Science and Technology (ICC)

# Preface

Environmental technology offers enormous market potential!



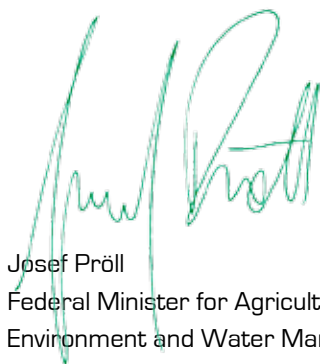
Photo: BMLFUW/Rita Newman

Environmental and climate protection are crucial challenges of our times. At the same time environmental technology offers enormous market potential. In this context **enviotech<sup>2008</sup>**, being the first international congress for environmental technology and renewable energy, is of utmost importance. The congress and the technical exhibition bring together the technical knowledge of experts from research, development, industry and investment. This bundled know-how generates future-oriented impulses and demonstrates new trends.

In the host country Austria, which is a pioneer concerning environmentally friendly technologies, and in the host city Vienna, which is a bridgehead for the transfer of information and the flow of investments between East and West, **enviotech<sup>2008</sup>** presents itself as an ideal platform for the dialogue at an international level and the development of business relationships on a global scale.

Apart from lectures held by experts from all parts of the world, there will be an opportunity for a personal exchange within the framework of face-to-face business talks in two parallel congress fora. Another priority will be the 4th European forum on eco-innovation which will deal, within the framework of **enviotech<sup>2008</sup>**, with the opening up of global market opportunities. The technical exhibition will offer an opportunity to get informed about the most recent developments and solutions in the fields of water management, waste management, renewable energies, services and technology transfer.

I wish you an **enviotech<sup>2008</sup>** with informative presentations and interesting business contacts – as an important contribution to the improvement of the environmental situation and in favour of sustainable economic growth.



Josef Pröll  
Federal Minister for Agriculture, Forestry,  
Environment and Water Management



# Join envietech<sup>2008</sup>

## The International Congress and Exhibition for you...

The **envietech<sup>2008</sup>** aims to bring suppliers and users of environmental technology and renewable energy together and you can personally benefit and choose from one of the offers below:

- **Give a presentation**
- **Arrange a face to face business talk** in the business lounge
- **Meet with an expert** and join the discussion
- **Exhibit your product or your service** to your target clients
- Sponsor the **event and promote your product and company profile**
- **Find your partner for strategic cooperation or joint ventures**
- **Benefit from support and consultancy** from experienced experts or users



## Meet World Class...

World class in both technology providers and presenters will be at the **envietech<sup>2008</sup>** to meet with you! Some selected highlights from science, industry and politics are presentations by

- **Jeremy Rifkin, USA**, Founder and President of The Foundation on Economic Trends Washington, DC
- **Josef Pröll, Austria**, Federal Minister of Agriculture, Forestry, Environment and Water Management
- **Thomas Leysen, Belgium**, CEO, Umicore, Belgium
- **Peter Carl, Belgium**, Director of DG Environment, European Commission (to be confirmed)
- **And many more...**

## Get the Experience...

Meet with the experts of your choice in the business lounge, listen in and discuss in the three congress tracks

- **Environmental Technology**
- **Renewable Energy**
- **4th European Forum on Eco-innovation**

## See the Best...

State of the art environmental technology and renewable energy sourcing will be ready for you to see and experience

- **during the exhibition hours and**
- **on the technical tours**

## Enjoy Vienna...

Vienna shows its charm all year round. The event will take place during the **famous Vienna Ball Season** and the organisers have arranged great entertainment for participants and accompanying persons.

**Make your reservation now and don't miss the envietech<sup>2008</sup> !**

# Short descriptions

## Track 1: Environmental Technology

The impacts of climate change can no longer be ignored. We can still counter these threats if we act now.

The environmental technology track of **enviotech<sup>2008</sup>** shows ways how to meet this challenge most effectively, in time and simultaneously do this in a way that sustains economic growth.

In the opening panel discussion, prominent specialists point out strategies, incentives as well as other instruments and tools to boost innovation and dissemination of environmental technologies.

Following sessions will: identify best practice projects in the relevant fields; present joint projects between municipalities, companies and research, and demonstrate further development of the environmental technology industry and emerging technologies.

## Track 2: Renewable Energy

As part of ICC's series "Science meets Industry", the renewable energy track will mainly focus on the technology transfer in the area of renewable energy, biofuels, new plants, wind and solar energy, biomass, sustainable agriculture, response to climate change and climate protection efforts, new developments and new markets. This part of the **enviotech<sup>2008</sup>** will offer the opportunity to benefit from the newest developments, to evaluate the options for their implementation in a local environment, and to select promising projects for potential investors.

## Track 3: ETAP Forum

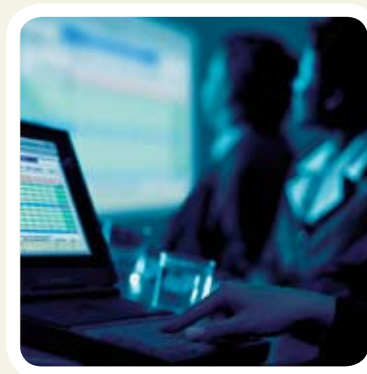
The European Commission together with Austria and Sweden is organising the "The 4th European Forum on Eco-innovation: Unlocking Global Market Opportunities"

The Environmental Technology Action Plan (ETAP) Forum intends to bring together a large number of chief executives of eco-technology firms, high level representatives of national administrations, European research institutes and EU representatives. The Forum is a platform aiming at exchanging experiences, highlighting opportunities, elaborating strategies and promoting environmental technologies world-wide.

## Track 4: Business Lounge

Meet people for informal talks in the Business Lounge!

The Business lounge of **enviotech<sup>2008</sup>** offers face to face talks with experts, providers and vendors of environmental technology. Appointments with personally selected experts can be arranged in advance or just by dropping by the **enviotech<sup>2008</sup>** Business Lounge directly. The business lounge is a unique opportunity to network and initiate cooperations, to meet with an important contact in person, to get first hand information or to finalise deals.



## Exhibition

The accompanying international tradeshow is considered a most important integral element of **enviotech<sup>2008</sup>**. All production companies, service companies and research institutions offering environmental solutions, particularly in the fields of water, refuse, renewable energy, services and technology transfer are invited to exhibit at this international platform.

# Congress at a Glance

## 30 January 2008

Welcome Reception	
18:00 - 23:00	<b>The Federal Minister for Agriculture, Forestry, Environment and Water Management Mr. Josef Pröll requests the pleasure of your company at a welcome reception in the Federal Ministry of Agriculture, Forestry, Environment and Water Management, Marmorsaal, Stubenring 1, A-1010 Vienna</b>

## 31 January 2008

08:00 - 18:00		Registration	
08:00 - 18:00		Exhibition	
Registration	09:30 - 10:45	<b>Opening of envietech<sup>2008</sup> ( Hall E1 )</b>  <b>Josef Pröll</b> Federal Minister of Agriculture, Forestry, Environment and Water Management, Austria  <b>Christoph Leitl</b> President of the Austrian Federal Economic Chamber, Austria  <b>Timo Mäkelä</b> , Director of Sustainable Development and Environmental Integration Directorate, DG Environment, European Commission, Belgium  <b>Ulrike Rabmer-Koller</b> CEO Rabmer Bau, Chairwoman of the Advisory Board of the Network Environmental Technology  <b>Jeremy Rifkin - Keynote Address:</b> Jeremy Rifkin is president of the Foundation on Economic Trends and the author of 17 best-selling books on the impact of scientific and technological changes on the economy, the workforce, society, and the environment. His most recent books include <i>The Hydrogen Economy</i> , <i>The European Dream</i> and <i>The Biotech Century</i> .	
	10:45 - 11:15	<b>Coffee Break &amp; Exhibition</b>	
	11:15 - 12:15	<b>Austrian Environmental Technology Award Ceremony</b>	<b>ETAP Forum</b> (by invitation only) "Global Markets"
	12:15 - 13:30	<b>Lunch &amp; Exhibition</b>	

		Parallel Congress Tracks				
Registration	13:30 - 17:30	Environmental Technology ( Room E559 )	Renewable Energy ( Room E557 )	ETAP Forum (by invitation only) ( Hall F2 )	Exhibition	Business Lounge ( Foyer E )
	<b>Session 1</b> 13:30 - 15:00	Political Framework & Trends	Technological Trends	New Business Opportunities		
	15:00 - 15:30	<b>Coffee Break &amp; Exhibition</b>				
	<b>Session 2</b> 15:30 - 17:30	Best Practice Projects & Models	Best Practice Projects & Models	Issues for Business		

21:30	<b>Social Event in the Historic City Centre of Vienna „Ball der Technik“ Heldenplatz, 1014 Vienna</b>
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# 1 February 2008

	08:00 - 15:00	Registration			
	08:00 - 15:00	Exhibition			
Registration	08:30 - 15:00	Parallel Congress Tracks (cont'd) Business Lounge: Cooperation / Business Round Tables			Exhibition Business Lounge ( Foyer E )
		Environmental Technology ( Room E559 )	Renewable Energy ( Room E557 )	ETAP Forum (by invitation only) ( Hall F2 )	
	Session 3 08:30 - 10:00	Innovation & Technological Trends	Political and Socio-Economic Framework - General Trends	Leadership, the Key to Unlocking Global Markets	
	10:00 - 10:30	Coffee Break & Exhibition			
	Session 4 10:30 - 12:00	Cooperation Meetings in Business Lounge	Best Practice Projects & Models (Part 2)	Moving forward from the Conference	
	12:00 - 13:00	Lunch & Exhibition			
	13:00 - 15:00	Exhibition & Special Workshops (organized by selected exhibitors, optional)			
	15:00	Closing of envietech <sup>2008</sup>			
	13:00 - 17:00	Optional: Technical Tours			

# Congress Tracks

## Environmental Technology

### Track 1

Environmental threats are advancing – more rapidly than originally expected. Several international reports issued in recent years provide ever-increasing evidence of the harmful impact of human activities on the environment. The impacts of climate change can no longer be ignored. We can still counter these threats if we act now. Systematic and cohesive action as well as ecologically sound habits by authorities, industries, and consumers are strongly needed at a European and global level.

The environmental technology track of **enviotech<sup>2008</sup>** shows way, how to meet this challenge most effectively, in time and simultaneously do this in a way that sustains economic growth. In the opening panel discussion of the track prominent specialists point out strategies, incentives as well as other instruments and tools to boost innovation and dissemination of environmental technologies. The following session identifies best practice projects in the relevant fields that are of exemplary quality to be assigned into the huge market for environmental technological products, technologies and services in Europe, especially in CEE and SEE.

Joint projects between municipalities, companies and research but also joint implementation of interdisciplinary, across boarder research and innovation strategies are the focus of the second day of the environmental technology track. Further development of the environmental technology industry in Europe and emerging technologies are presented in the third session of the track. It addresses especially European research and technology cooperations in the environmental technology sector as well as the financing of these projects. The session is followed by the unique opportunity to network and initiate co-operations, to meet with an important contact in person, to get first hand information or to finalise deals.



# Renewable Energy

## Track 2

This congress track will be part of ICC's series "Science meets Industry" and will mainly focus on the technology transfer in the area of renewable energy, biofuels, new plants, wind and solar energy, biomass, sustainable agriculture, response to climate change and climate protection efforts, new developments and new markets. This track will try to establish a unique meeting point between the various European and other international initiatives to connect science and industry, research and production.

Invited are scientists, representatives from EU's Technology Platforms and related Agencies, representatives from EU funded research projects, companies (industries and SMEs), providers and developers of environmental technologies, decision makers, investors, buyers and sellers, and representatives from national and international institutions (including the European Commission) to discuss the latest trends and developments in exploiting new sustainable and renewable energy resources. This part of the **envietech<sup>2008</sup>** will offer the opportunity to benefit from the newest developments, to evaluate the options for their implementation in a local environment, and to select promising projects for potential investors. For research institutes and academia the presentations will depict cooperation opportunities and partner search possibilities for joint ventures and future research projects.



# Congress Tracks

## ETAP Forum

### Track 3

#### **The 4th European Forum on Eco-innovation: Unlocking global market opportunities**

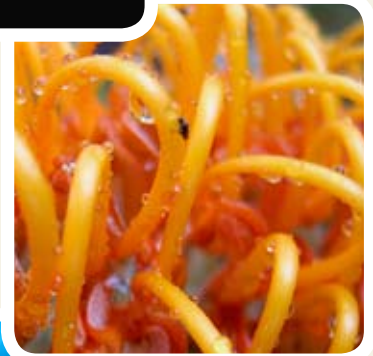
The European Commission together with Austria and Sweden is organising the “European Forum on Eco-innovation: Unlocking Global Market Opportunities” on 31 January – 1 February in Vienna. The Environmental Technology Action Plan (ETAP) fosters the take up of environmental technologies and eco-innovation. The EU-wide plan was launched in 2004.

The Forum is a specific action under this Action Plan and intends to bring together a large number of chief executives of eco-technology firms, high level representatives of national administrations, European research institutes and EU representatives. The Forum is a platform aiming at exchanging experience, highlighting opportunities, elaborating strategies and finding solutions.

The subject to be dealt with at the 4th Forum “Unlocking global Market Opportunities” is promoting environmental technologies world-wide. The EU has unique experience in the development and deployment of environmental technologies. On the other hand the global situation is rapidly changing and we are faced with increasing competition. Europe needs to react swiftly.

The objectives of the Forum are the following:

- to discuss the global opportunities, barriers and threats for European companies working in the field
- to learn from examples and exchange experience
- to explore the different options in important technology areas [Forum explores all topics with MS and EC]
- to be a meeting place for informal discussions and a platform for co-operation
- make specific suggestions for policy action.



# Business Lounge

Meet people for informal talks in the Business Lounge!

**enviotech<sup>2008</sup>** offers face-to-face talks with experts, providers and vendors of environmental technology. Make your appointment with a specific partner in advance or just drop by the **enviotech<sup>2008</sup>** Business Lounge. Make use of this unique opportunity to network and initiate co-operations, to meet with an important contact in person, to get first hand information or to finalise deals.

The **enviotech<sup>2008</sup>** Business Lounge provides you with the ideal infrastructure for having a pleasant and fruitful conference. Discuss results presented in one of the Congress Tracks in more detail with the renowned international experts or discover business opportunities with one of the exhibitors in a “quiet corner”. To maximise your profit while attending the **enviotech<sup>2008</sup>** arrange your personal congress schedule by going to “my enviotech” at [www.enviotech.at](http://www.enviotech.at) and fix your face-to-face business or cooperation talks for February 1st from 10.30 to 12.30 in advance. We are happy to assist you with any requests in the **enviotech<sup>2008</sup>** Business Lounge.

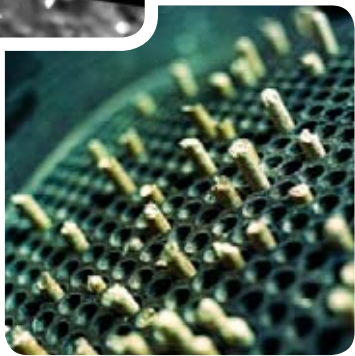
## Exhibition

The accompanying international tradeshow is considered a most important integral element of **enviotech<sup>2008</sup>**.

Who should exhibit?

All production companies, service companies and research institutions offering environmental solutions, particularly in the fields of

- **Water** (extraction & treatment; processes for water & sewage treatment including plant construction; techniques for water distribution & sewers, their construction, modernisation and cleaning; production of pipes, shafts, pumps, lifting tackle, outlets and fittings)
- **Waste** (disposal & recycling; equipment, plants & vehicles for collection, transport and treatment as well as recycling and reutilization)
- **Renewable Energy** (biomass, biogas & biofuel technologies, processing, transport & treatment; utilization; turnkey plants)
- **Services** (environmental management, disposal services; analysis/laboratory/control technology; financing; IT hard- and software; societies)
- **Technology Transfer** (research institutions, universities, publishers, literature, education).



# Technical Tours

Technical tours to various congress relevant sites in Vienna, Austria and its surroundings will complement the **envietech<sup>2008</sup>** Congress and Exhibition Programme. Four different bus tours will feature specific applications of environmental technology and renewable energy to offer an on-site insight into modern communal waste management and exploitation of renewable energy sources. On the way to the destinations experts and skilled tour guides provide valuable information and explain Vienna's environmental strategies.

**You are welcome to join the following bus tours:**

**Tour 1: Waste management in a large city**

including a guided tour of the City of Vienna's waste treatment plant (sorting plant, compost treatment plant, treatment plant for combustion residues, central storage of hazardous waste, waste collection site, disposal of waste fridges, refrigeration equipment and computer monitors), a guided tour of the Rautenweg landfill site (landfill site for residual waste using the secure Vienna Chamber System with retention walls), and a guided tour of the approx. 26,000m<sup>3</sup> large Lobau composting plant.

**Tour 2: Thermal waste treatment**

including a guided tour of the Simmering thermal waste treatment plant (incineration of hazardous waste and sewage sludge, listed in the register of the EU Eco-Management and Audit Scheme), of the Pfaffenau biogas plant (producing renewable energy from biological waste), and of Vienna's main sewage treatment plant.

**Tour 3: Low energy buildings and zero energy buildings**

including a guided tour and presentation of selected projects in Vienna (houses, schools, etc.).

**Tour 4: Alternative fuels and alternative modes of transport**

including a guided tour of Europe's largest biodiesel plant situated in the Lobau oil harbour and a guided tour of the Vienna Harbour providing multifunctional services and employing state-of-the-art technologies.

Busses will leave from the main entrance of ACV at 13:00. The Technical Tours will take approximately 3 hours. The four different tours are run in parallel so that only one tour can be booked per participant. Please mind that only limited seats are available for the Technical Tours.



# Social Programme

## „Ball der Technik“, 31-01-2008

### In the Hofburg-Imperial Palace

The „Ball der Technik“ is the Ball in Vienna with the oldest tradition. It dates back to the so called „Technikerkränzchen“, which started 1815, the year when the „Polytechnisches Institut“ (today: Vienna University of Technology) was founded by the emperor Franz I.

Nowadays this famous Ball takes place in the Wiener Hofburg, the former imperial palace of the Habsburg dynasty and is well known for its excellent music and its lively atmosphere. Unique among the Viennese Balls is the traditional Austrian Folk Music played in the so called Radetzky Apartement.

Each traditional Ball starts with an opening ceremony. Their original idea was the introduction of the „Debütanten“, young ladies and gentlemen, into their first big society event.

Entrance fee: Euro 60.- (entrance and booking of seat only, excl. food & beverage)

Admission: 8.30 p.m.

Ceremonial opening: 9.30 p.m. (end of the Ball: 5.00 a.m.)

### Vienna Heuriger - an evening at the wine tavern, 01-02-2008

Vienna is one of the few capitals, that produce their own wine. Therefore the viniculture and the visit of the „Heurige“ (wine tavern, where the wine-maker may sell their own wine) is a Viennese tradition. There are some typical wine villages with an idyllic atmosphere in the Vienna surroundings. Grinzing and Nussdorf are doubtless the most popular of them. You will spend an unforgettable, typical Viennese evening in the cosy atmosphere of the Heurigen, drinking excellent wine, enjoying the sumptuous buffet while listening to original and authentic music. The selected wine tavern was awarded with the Austrian Eco-Label for tourism, which is a special environmental programme for hotels and restaurants in Vienna.

Transfer from the hotel and back by bus.

Pickup from the hotel: 7 pm

Cost: Euro 60.- per person

Included services: 1/4L wine, „Heurigen“-buffet and dessert, bus transfer, guide, music at the tavern

In case of less than the minimum number of participants, the Wine Tavern Evening will not take place.



# Sightseeing Tours

## 1) Historical City Tour & Schönbrunn Palace, Thursday, 31-01-2008

Starting at the famous Ringstraße – the boulevard of Vienna, we show you numerous magnificent buildings, such as the State Opera House, the Museum of Fine Arts and the Natural History Museum, the cultural district of the MuseumsQuartier, the former Habsburg winter residence - the Hofburg, the Parliament, the City Hall and the Burgtheater.

The highlight of this tour will be a visit of the Schönbrunn Palace.

Schönbrunn (meaning “beautiful fountain”) represents one of the most important pieces of Austria’s cultural heritage. Maria Theresia lived in this former summer residence of the Habsburg family.

Experience a walk through the splendid imperial apartments of the Habsburg family. Each and every room, every hallway has their own story to tell – stories that are characteristic for the way of live and the atmosphere of imperial times.

Pickup from the Austria Center Vienna: 2pm

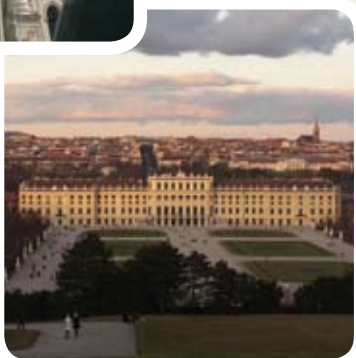
Time frame: approx. 3 h

Cost: Euro 35.- per person

(included in accompanying person fee)

Included services: English speaking guide, bustransfer, entrance fee Schönbrunn





## 2) Vienna Highlights (sightseeing per bus), Saturday, 02-02-2008

This tour will give you an overall impression of the most significant sights of Vienna, such as the Museum of Applied Art, the State Opera House, Belvedere Palace, the Museum of Fine Arts and the Natural History Museum, the MuseumsQuartier, the Hofburg - the former imperial winter palais, the Parliament, the City Hall and the Burgtheater.

Also the modern Vienna, on the other side of the Danube as well as the Donauturm will be visited.

From the terrace of the Donauturm ("Danube Tower") you will have a great view over the whole city!

Pickup from the hotel: 9am

Time frame: approx. 3 h

Cost: Euro 25.- per person

Included services: English speaking guide, bustransfer, ticket Donauturm

In case of less than the minimum number of participants, the Vienna Highlights Tour will not take place.

Track 1	Environmental Technology ( Room E559 )	
09:30 – 10:45	Opening of <b>enviotech<sup>2008</sup></b> ( Hall E1 )	
10:45 – 11:15	Coffee Break & Exhibition	
11:15 – 12:15	<b>Austrian Environmental Technology Award Ceremony</b>	<b>ETAP Forum</b> (by invitation only) „Global Markets“
12:15 – 13:30	Lunch & Exhibition	
<b>13:30 – 17:30</b>	<b>Parallel Tracks</b>	
<b>Session 1</b>	<b>Political Framework &amp; Trends</b>	
13:30 – 15:00	<p>Panel discussions consisting of prominent specialists to topics such as</p> <ul style="list-style-type: none"> <li>• European Ecological Industrial Policy,</li> <li>• Development of the Environmental Technology Industry,</li> <li>• Financing Instruments and</li> <li>• Master Plan Environmental Technology</li> </ul> <p><b>Chair: Bernhard Puttinger</b>, ECO World Styria, Austria</p> <ul style="list-style-type: none"> <li>• <b>Timo Mäkelä</b>, Director of Sustainable Development and Environmental Integration Directorate, DG Environment, European Commission, Belgium</li> <li>• <b>Uffe Bundgaard-Jørgensen</b>, CEO of InvestorNet - Gate2Growth, Denmark</li> <li>• <b>Angela Köppl</b>, Deputy Director and Expert for Environmental Economics of Austrian Institute of Economic Research (Wifo), Austria</li> </ul>	
15:00 – 15:30	Coffee Break & Exhibition	
<b>Session 2</b>	<b>Best Practice Projects &amp; Models</b>	
15:30 – 17:30	<p>Plenary presentations of selected models and best practice projects in the fields of</p> <ul style="list-style-type: none"> <li>• Energy Efficiency &amp; Renewable Energy,</li> <li>• Materials Flow Management &amp; Waste,</li> <li>• Air Pollution Control,</li> <li>• Water Treatment &amp; Management as well as</li> <li>• Sustainable Construction</li> </ul> <p><b>Chair: Ilse Schindler</b>, Federal Environment Agency, Austria</p> <ul style="list-style-type: none"> <li>• <b>Virpi Mikkonen</b>, Project Manager of Erabuild - Strategic cooperation between national programmes promoting sustainable construction and operation of buildings, Finland <i>Best Practice Projects in the Field of Sustainable Construction in Finland</i></li> <li>• <b>Jurgis Staniskis</b>, Director of Institute of Environmental Engineering, Kaunas University of Technology, Lithuania <i>Preventive Innovation Generation, Financing and Implementation Scheme</i></li> <li>• <b>Rainer Bahnmüller</b>, International Cooperation, Austrian Energy Agency <i>Development of Standardized Contracting Packages for Public Buildings in Bulgaria and Romania</i></li> <li>• <b>Leon Lozar</b>, Deputy General Director of Aquasystems d.o.o., Slovenia <i>Central Waste Water Treatment Plant Maribor B.O.T Project - Experiences on PPP Environmental Foreign Direct Investment in Slovenia - Project Development and Implementation</i></li> <li>• <b>Josef Stubenvoll</b>, Managing Director of TBU - Technisches Büro für Umwelttechnik, Austria <i>Application of Austrian Experience in Environmental Technologies in Eastern and Western Countries</i></li> </ul>	
17:30 – 18:00	Exhibition & Networking	
21:30	Social Event in the Historic City Centre of Vienna „Ball der Technik“	

Track 1	Environmental Technology ( Room E559 )
08:30 – 15:00	Parallel Tracks
Session 3	Innovation & Technological Trends
08:30 – 10:00	<p>In this session reputable persons from R&amp;D and innovative companies present new technologies and further development of the environmental technology industry in Europe in the fields of</p> <ul style="list-style-type: none"> <li>• Energy Efficiency &amp; Renewable Energy,</li> <li>• Materials Flow Management &amp; Waste,</li> <li>• Air Pollution Control,</li> <li>• Water Treatment &amp; Management</li> </ul> <p><b>Chair: Stefan Gara</b>, Managing Director ETA environmental management consulting Ltd., Austria</p> <ul style="list-style-type: none"> <li>• <b>Jimmy Anjevall</b>, Energikontoret Jämtland, Jämtland County Energy Agency, Sweden <i>Jämtland County - Aiming at a 100% Renewable Energy Region</i></li> <li>• <b>Helmut Rechberger</b>, Institute for Water Quality, Resources and Waste Management, Group of Waste and Resources Management, Vienna University of Technology, Austria <i>Determination of Renewable Energy and Greenhouse Gas Emissions Share from Waste Incineration</i></li> <li>• <b>Matthias Buchert</b>, Coordinator of the Infrastructure &amp; Enterprises Division at Öko-Institut, Germany <i>Precious Metals Recycling in a Global Perspective</i></li> <li>• <b>Antonio Lopez</b>, IRSA – CNR Water Research Institute, Italy, Scientific Coordination and Administrative Project Management of INNOWATECH <i>INNOWATECH – an EU Project Aimed at Assessing the Effectiveness of Innovative and Integrated Technologies for the Treatment of Industrial Wastewater</i></li> </ul>
10:00 – 10:30	Coffee Break & Exhibition
10:30 – 12:00	<b>Corporation Meetings in Business Lounge</b>
12:00 – 13:00	Lunch & Exhibition
13:00 – 15:00	Special Workshops
13:00 – 15:00	Optional: Technical Tours
15:00	Closing of <b>envietech<sup>2008</sup></b>

**Contact:**

**Dörthe Kunellis**, Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

**E-Mail:** [Doerthe.Kunellis@lebensministerium.at](mailto:Doerthe.Kunellis@lebensministerium.at)

Track 2	Renewable Energy ( Room E557 )	
09:30 – 10:45	Opening of <b>enviotech<sup>2008</sup></b> ( Hall E1 )	
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<b>13:30 – 17:30</b>	<b>Parallel Tracks</b>	
<b>Session 1</b>	<b>Technological Trends</b>	
13:30 – 15:00	<p>Plenary presentations of selected technological horizontal trends in the fields of</p> <ul style="list-style-type: none"> <li>• Energy Efficiency &amp; Renewable Energy,</li> <li>• Materials for Renewable Energy Production,</li> <li>• Cost Input versus Output,</li> <li>• Demand and Measures</li> </ul> <p><b>Chair: Klaus Reisinger</b>, ClimatePartner Austria GmbH, Vienna, Austria</p> <ul style="list-style-type: none"> <li>• <b>Roland Poms</b>, ICC - International Association for Cereal Science &amp; Technology, Vienna, Austria <i>Welcome and introduction to the Renewable Energy track</i></li> <li>• <b>Klaus Reisinger</b>, ClimatePartner Austria GmbH, Vienna, Austria <i>Climate neutral - a concept for CO<sub>2</sub> reduction</i></li> <li>• <b>Jan W. Bleyl</b>, Graz Energy Agency Ltd, Austria <i>Integration of Demand Side Measures into Energy Supply Contracting Models</i></li> <li>• <b>Ronald J. Pohoryles</b>, ICCR - Interdisciplinary Centre for Comparative Research in the Social Sciences, Vienna, Austria <i>Biomass – a reasonable Concept for a Sustainable Future</i></li> <li>• <b>Josef Reiter-Haas</b>, SEEG Reg.Gen.m.b.H., Mureck, Austria <i>„Mureck Energy Cycle“</i></li> </ul>	
15:00 – 15:30	Coffee Break & Exhibition	
<b>Session 2</b>	<b>Best Practice Projects &amp; Models</b>	
15:30 – 17:30	<p>Plenary presentations of selected models and best practice projects in the fields of</p> <ul style="list-style-type: none"> <li>• Energy Efficiency &amp; Renewable Energy,</li> <li>• Solar Energy,</li> <li>• Wind Energy and</li> <li>• Biomass Energy</li> </ul> <p><b>Chair: Bernhard Puttinger</b>, ECO World Styria, Austria</p> <ul style="list-style-type: none"> <li>• <b>Werner Pink</b>, Pink GmbH, Austria <i>Solar Cooling</i></li> <li>• <b>Friedrich Lettner</b>, Institute of Thermal Technology, Technical University Graz, Austria <i>Biomass Gasification CHP for high efficient, decentral small scale applications</i></li> <li>• <b>Alek Arabadjian</b>, Geopower OOD, Renewable Energy, Sofia, Bulgaria <i>Wind farm - Kavarna</i></li> <li>• <b>Martha Schreiber</b>, Funktionswerkstoffe Forschungs- und Entwicklungs GmbH, Eisenstadt, Austria <i>Vanadium Redox Flow Battery Improved Technology</i></li> <li>• <b>Johann Schweiger</b>, Cellstrom GmbH, Austria <i>Solar energy 24 hours a day</i></li> </ul>	
17:30 – 18:00	Exhibition & Networking	
21:30	Social Event in the Historic City Centre of Vienna „Ball der Technik“	

Track 2	Renewable Energy ( Room E557 )
08:30 – 15:00	Parallel Tracks
Session 3	Political and Socio-Economic Framework - General Trends
08:30 – 10:00	<p>Keynote speakers to set the stage for discussion by prominent specialists to topics such as</p> <ul style="list-style-type: none"> <li>• International Organisations</li> <li>• Global Trends and Energy Resources and</li> <li>• Financing Instruments</li> </ul> <p><b>Chair: Roland Ernest Poms</b>, ICC – International Association for Cereal Science and Technology, Vienna, Austria</p> <ul style="list-style-type: none"> <li>• <b>Ralph Sims</b>, International Energy Agency, OECD, Paris, France <i>Opportunities for the Agricultural Sector from Renewables, Biofuels and Climate Change</i></li> <li>• <b>Uffe Bundgaard-Joergensen</b>, Gate2Growth, Denmark <i>Funding strategies for projects in environmental technology and renewable energy</i></li> <li>• <b>Andreas Glatzer</b>, RENERGIE, Austria <i>Financing of renewable energy projects – The equity investor's perspective</i></li> </ul>
10:00 – 10:30	Coffee Break & Exhibition
10:30 – 12:00	Cooperation Meetings in Business Lounge
Session 4	Best Practice Projects & Models (Part 2)
10:30 – 12:00	<p>Plenary presentations of selected models and best practice projects in the fields of</p> <ul style="list-style-type: none"> <li>• Biomass Energy and</li> <li>• Energy from Food Production By-Products</li> </ul> <p><b>Chair: Emmerich Berghofer</b>, BOKU – University of Natural Resources and Applied Life Sciences, Department for Food Science and Technology, Vienna, Austria</p> <ul style="list-style-type: none"> <li>• <b>Senad Novalin</b>, BOKU – University of Natural Resources and Applied Life Sciences, Department for Food Science and Technology, Vienna, Austria <i>Renewable Energy from Dairy Production</i></li> <li>• <b>Hans Valenzuela Delphin</b>, Universidad de los Andes Mérida, Venezuela <i>Production of Agrobioalcohol from Rice Flour</i></li> <li>• <b>Stéphane Guilbert</b>, INRA, Unité Ingénierie des Agropolymères et Technologies Emergentes, Montpellier, France <i>Protein based Materials: A new Opportunity for the Utilization of Protein rich Co-product of plant Bio-refineries</i></li> <li>• <b>Liu Zhongdong</b>, Henan University of Technology, Zhengzhou, China <i>Drying Vegetables and Fruits using Scrap Nitrogen of steel-making Plant</i></li> </ul>
12:00 – 13:00	Lunch & Exhibition
13:00 – 15:00	Special Workshops
13:00 – 15:00	Optional: Technical Tours
15:00	Closing of <b>enviotech<sup>2008</sup></b>

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# Detailed Programme

Thursday, 31 January 2008

Track 3	ETAP Forum ( Hall F2 )
09:30 – 10:45	Opening of <b>envietech<sup>2008</sup></b> ( Hall E1 )
Session 1	<b>Framing the Debate</b>
09:30 – 10:45	The opening session will highlight the potential and the challenges for businesses in unlocking the vast global market for eco-innovation.
10:45 – 11:15	Coffee Break & Exhibition
Session 2	<b>Practical Experience from the Field</b>
11:15 – 13:00	<p>This session explores key insights from business leaders and EU ambassadors who have been successful in breaking into global markets, including Asia and Russia.</p> <ul style="list-style-type: none"> <li>• <b>Jørgen M. Clausen</b>, CEO Danfoss</li> <li>• <b>Heinz Leuenberger</b>, Director, Energy and Cleaner Production Branche, UNIDO</li> <li>• <b>Arnold Black</b>, Network Director, Resource Efficiency Knowledge Transfer Network</li> <li>• <b>Tony Clark</b>, Counsellor for Trade and Investment Promotion, Embassy of Sweden in Beijing</li> </ul> <p><b>Issues Identification</b> Delegates identify key issue areas where action is needed to support environmental technology businesses in unlocking global markets</p>
13:00 – 14:00	Lunch
Session 3	<b>New Business Opportunities</b>
14:00 – 15:45	<p>This session considers the areas of intense activity that bring distinctive opportunities to businesses requiring innovative approaches such as adaptation to climate change and sustainable cities.</p> <p><b>Table Forums</b> Innovative Forum opportunity for delegates to share their own experiences in a small group setting.</p>
Session 4	<b>Issues for Business</b>
15:45 – 16:50	<p>We hear both the small and large-scale business perspective about the real challenges in entering global markets.</p> <ul style="list-style-type: none"> <li>• <b>David Gordon</b>, CEO Windsave Limited, UK</li> <li>• <b>Thomas Leysen</b>, CEO Umicore, Belgium</li> </ul> <p><b>Issues Identification</b> Delegates identify key issue areas where action is needed to support environmental technology businesses in unlocking global markets.</p>
19:00	Dinner at the Naturhistorisches Museum

Track 3	ETAP Forum ( Hall F2 )
08:30 – 15:00	Parallel Tracks
Session 5	Leadership, the key to unlocking global markets
09:30 – 11:00	<p>This session focuses on how essential are risk-taking and leadership components to achieve the step-change required for eco-innovation.</p> <ul style="list-style-type: none"> <li>• <b>Ola Alterá</b>, Swedish State Secretary to the Minister for Enterprise and Energy</li> <li>• <b>Per Sandberg</b>, WBCSD</li> <li>• <b>Georg Antesberger</b>, CEO Siemens AG Österreich</li> </ul> <p><b>Recommendations for Action</b> Delegates develop a set of key recommendations for the Commission and other key institutions to help achieve a step-change in opening up global markets for European environmental technology businesses.</p>
11:00 – 11:30	Coffee Break & Exhibition
Session 6	Moving forward from the Conference
11:30 – 13:15	<p>Final Plenary session to consider and build consensus on recommendations from the previous session and identify key next steps.</p> <ul style="list-style-type: none"> <li>• <b>Timo Mäkelä</b>, Director for Sustainable Development and Integration, DG Environment</li> </ul> <p><b>Closing remarks:</b> <b>Gunter Liebel</b>, Director General of Political Environment Affairs, Ministry of environment, Austria</p>
13:00 – 17:00	Technical Tours

**Contact:**

**Erich Ober**, Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

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## Best Practice Projects in the Field of Sustainable Construction in Finland

**Virpi Mikkonen**

TEKES – Finnish Funding Agency for Technology and Innovation

ERABUILD – Strategic Cooperation between National Programmes Promoting Sustainable Construction and Operation of Buildings

Kyllikinportti 2, 00101 Helsinki, Finland

TEKES is the main government financing and expert organization for research and technological development in Finland. TEKES finances industrial R&D projects as well as projects in universities and research institutes. TEKES especially promotes innovative, risk-intensive projects. Half of the TEKES funding is channelled through the technology programmes. The programmes are established in strategically important R&D areas that TEKES has identified together with the business community and researchers.

ERABUILD is an EU funded consortium of ten countries sharing knowledge and resources of national construction research programmes. The aim is to build durable cooperation of European funding bodies in order to enable us to increase the impact of research of the real estate and construction sector and thus also enhance the quality in research and performance of the industry. A step towards this aim is preparing a trans-national R&D programme in the area.

The built environment has a large impact on the natural environment, economy, health and productivity. Buildings account for 17% of world's fresh water withdrawals, 25% of world's wood harvest and 40% of world's materials and energy flows. Furthermore, in today's context, 80% of energy consumed during the whole life-cycle of a building is consumed during its service life and only 20% is consumed in the construction phase for materials, construction process and demolition. Decisions concerning built environment have significant economic, environmental and social consequences. Therefore many countries support both research and industrial R&D to strive at more sustainable solutions.

There are several showcases and already established concepts of sustainable construction all around the world. Yet, in many countries the business for sustainable construction is not booming as fast as could be expected. The challenge is to take in everyday use the best practices we can find either at home or abroad.

TEKES launched in autumn 2007 a new technology programme Sustainable Community to enhance business activities and implementation of technologies in the field of sustainable construction. The mission of the programme is to develop international competitive business concepts, services and products for sustainable and eco-efficient communities. TEKES believes that, although, enabling technologies for eco-efficient and sustainable communities already exist, the integration of technologies, processes and services is needed in order to bring about business activities of large-scale. There is also need for new business models and processes and co-operation models which are exceeding traditional 'limits and borders' of different stakeholders. Sustainable Communities technology program also offers the platform for international R&D and business collaboration.

ERABUILD partners are preparing to launch a trans-national programme on Sustainable Renovation. The goal of the programme is to increase both the quality and quantity of renovation activity and to contribute to a more energy-efficient and user-friendly building stock in Europe.

## Preventive Innovation Generation, Financing and Implementation Scheme

**Jurgis Staniskis**

Institute of Environmental Engineering, Kaunas University of Technology  
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Role of industry in the process of sustainable industrial development is obvious. It relates to changes in production processes, products and services aimed at reduction of impact to the environment in the entire life cycle perspective that result in improvement of environmental, economic and social performance of enterprises. To ensure sustainable industrial development, systematic application of the following measures is needed:

- cleaner production (CP),
- environmental and integrated management systems,
- product related measures of sustainable industrial development
- [e.g. eco-design, life cycle approach],
- sustainability reporting.

CP should be an essential part of any comprehensive environmental management system at an enterprise or national level. In many cases the adoption of CP improvements can reduce or even eliminate the need for end-of-pipe investments and therefore can have both environmental and economic benefits. Experience shows, that often companies having identified cost-effective and technically-feasible CP options, may still not be able to make necessary CP investment to realise the financial benefits and environmental advantages. Financing of CP projects varies among countries and types of the projects. Domestic and international efforts to strengthen environmental financing still face a number of serious obstacles, many of which are related to profound economic, political and social problems.

The Institute of Environmental Engineering (APINI) (EU Centre of Excellence in Sustainable Industrial Development (APINI – SID)) initiated implementation of CP concept in Lithuania and is the main institution in the country working in this area. In 1992-2007, with support provided by different donors and in co-operation with different foreign and local partners APINI supported more than 150 Lithuanian companies to implement CP projects.

In 1997, the Institute of Environmental Engineering has developed a system for preventive innovation development / implementation. The system consists of the pool of experts (on preventive innovation generation, financial engineering, implementation and monitoring), the financing source – soft credit line at Nordic Environment Finance Corporation (NEFCO) and industrial companies. The system is based on company's material and energy flows, and properly evaluated environmental costs based on Environmental Management Accounting (EMA). The methodologies employed in the system are flexible, can be applied to different company levels and enable decision-maker to obtain information in terms of the intended economic and environmental purposes. The system has been used for development of 141 innovations in 69 Lithuanian industrial companies. APINI experience was successfully disseminated in Africa, South East Asia, Central America and CEE.

This presentation provides an overview of activities and experience of APINI in development of preventive innovations in industry and lessons learned in terms of strengthening corporate commitment in sustainable development.

Key words: Sustainable Industrial Development, Preventive Innovation, Material and Energy Balance, Environmental Management Accounting, Financial Engineering

## Development of Standardized Contracting Packages for Public Buildings in Bulgaria and Romania

### Energy Partnerships – promoting Austrian Highlights in the field of energy and launching partnerships between companies

**Rainer Bahnmüller**

Austrian Energy Agency, International Cooperation  
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Main activities of the Austrian Energy Agency in the Partnership Programme:

- providing useful information on the legal and economical background of the respective energy sector,
- promotion of interesting Austrian initiatives and products like solar, biomass and hydro energy, energy efficiency strategies as contracting activities etc.
- identification of partner companies in both countries,
- identification and initializing joint projects,
- identification of programmes and partners for the realization and financing of projects.

Heat delivery contracting in Public Buildings

The aim of this initiative is an easier approach for municipalities to introduce energy efficiency in public buildings through a well defined package of measures, which contains a one stop solution as engineering, financing, as well as a matched procedure from the start, realization, all the way through an efficient boiler plant operation.

Setting the task: The majority of public buildings in Bulgaria are heated by individual boilers, mostly with (heavy) fuel oil. These boilers are often oversized, operated by manual regulation, are about 30 to 40 years old, have bad or no insulation, further there are leaks in the distribution system and there is no possibility for individual temperature control. Expected savings are between 30 to 50%. Usually the heating systems are so inefficient and the thermal quality of the buildings is so bad, that a normal level of room temperature means very high costs for a municipality. Therefore, temperatures in classrooms during wintertime hardly reach more than 16, 17 degrees Celsius.

Most of the thousands of boiler plants in the country have to be renewed.

Problems to be solved: Experience in practical approaches to raise energy efficiency in public administrations is unusual, realized projects still have pilot character.

- To find a partner company in Bulgaria is by far the main challenge. During dictatorship traditions of small trade have been destroyed and small companies have been centralized into huge complexes. Plumbers, small technical companies, which could be found nearly in every Austrian village, can hardly be found in Bulgaria. Most of the companies in this field are comparatively large. Their main interest is trade and selling of technical equipment. Due to the current boom in the building sector (rates of return have been between 30 to 40% in the last 5 years), these companies often are not motivated to work on a high level of quality. Heating equipment frequently is just sold to final customers without auxiliary engineering. The clients' requirements on the other side are moderate. Investment costs have high priority in comparison with operating costs.

- Only real estates and assets are accepted by banks as security for a loan. Interest rates are still high and local banks don't have experience in financing infrastructure projects.
- Standards in heating and lighting do not always meet the necessary level. In this case, efficiency measures do not necessarily reduce the costs. But efficiency makes a normal level of temperature feasible.

The challenge:

The market for efficient boiler plants is significant. Technical problems which have to be solved are roughly everywhere the same. A lot of buildings like schools or kindergartens built after the war have a standardized construction and very similar heating systems.

Specific costs of heat protection measures are comparatively very low, heat losses of the buildings on the other hand quite high. These measures result in much better cost benefit ratio than in Austria and makes even these measures economically interesting.

An efficiency product, which contains all important aspects such as: engineering, financing, production and sale of heat, operating and servicing of the boilers and a guaranteed heat tariff is developed. In other words, this package of financing, technical solutions and organizational measures, as a standardized solution should be easy to explain and will facilitate the access to municipalities.

Together with Bulgarian engineering companies several public buildings are analyzed and effects of saving measures calculated and defined. These technical reports are transferred into operational reports and presented in a folder.

A possible solution

The current boom in the construction sector leaves public buildings and their owners – municipalities behind. Policy is focused on making money – any public project has still only symbolic character. Things changed as Bulgaria joined the European Union as structural funds are mainly focused to projects upgrading infrastructure. So municipalities have become attractive partners for local businesses.

The approach of efficiency projects can be described with the following steps:

In cooperation with "En-Effect", the Bulgarian platform for energy efficiency in municipalities, motivated partners have been identified. By means of a so called rough or approximate analysis, public buildings are characterized by basic data like: heated surface, volume, consumed energy for heating and warm water or utilization profile. Thus, the municipalities' position regarding energy efficiency is defined. These rough statistics is the basis for a systematic selection of buildings.

The first pilot projects are a mean to demonstrate contracting and to discuss and define a joint approach between the municipality and the contractor, who is implementing this service package.

The partnership model includes cooperation between a Bulgarian engineering and installation company with an Austrian contractor. An experienced Austrian contractor is responsible for the organizational aspects, principles of operation, financing and contracts with the municipality. His local partner is realizing the measures and implements the actual installations.

## Central Waste Water Treatment Plant Maribor B.O.T. project Experiences on PPP environmental foreign direct investment in Slovenia – Project development and implementation

**Leon Lozar**

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In the mid nineteen nineties Slovenian society and economy have just started the last phase of transition from socialistic planning to capitalistic market economy. In line with Slovenia's ambitions to enter EU and to foster fast economical development a national environmental protection plan has been developed and published containing visible targets for adjustment of national environmental protection standards to those adopted by EU. Despite to non-promising socio-economic climate of that time in Maribor, the city authorities have, as first municipality in Slovenia, decided to cope with water pollution problems and to solve them, for Slovenian circumstances of that time, in a quite innovative way. To enable optimal use of municipal budgetary resources they have decided to use the state environmental tax for financing of the extension of the Maribor's sewage system, the main collector (DN 1600, 8km long connection between the city and WWTP) has been financed through PHARE funds and to built and operate the WWTP by using the benefits of Public Private Partnership. Herewith city authorities have merged into the ocean of unknown by being the pioneer for PPP in Slovenia.

Back in 1998 the level of investments in Slovenia was very low due to sanitation of national banking system. FDI were real rarities since the interest of the capital is clear and there were a lot of disturbing circumstances turning it away. The macro-economic prospects were not easily predictable. The Law on PPP was missing; so healthy FDI bringing high technology and indirect opportunities for penetration of local companies toward the southern markets were a real challenge. Namely, the problem that foreign investors faced at that time can be described with the question: are the Slovenian business environment, state and local administration and legislation sufficiently flexible and compatible with the initiative of foreign private capital oriented into communal infrastructure?

As WWTP Maribor was a »greenfield« project, its development and implementation has required »ad hoc« solving of demanding spatial, land ownership, administrative, tax and financing obstacles. The aim of the presentation is to present the reference regional PPP – BOT project, its concept, structure, the aims and benefits for the local community as well those attributes and leverage of the PPP concept which made possible that Municipality of Maribor resolved one of its environmental problems.

BOT infrastructure projects are very demanding, based on partnerships which can be built only by innovative approaches and solutions and being supported by the state and local politics sustaining economical criteria but never diminishing the role of public administration and authorities. As by means of PPP also technology and know-how transfer are taking place and interest of the private capital is a driver for efficiency, economization and optimal quality of the technical solutions for public infrastructure operation.

Serious obstacles for FDI PPP in Slovenia are non-competence of the public sector to follow the pace and dynamics of private sector, incompatible organizational culture of public bodies (the client) and sensitivity of the project prosperity to political turbulences. This needs to be urgently improved if Slovenia wants to use leverage of PPP for overcoming the 30% gap between its communal and social infrastructure needs comparing to available sources of state and EU funds.

## Application of Austrian Experience in Environmental Technologies in Eastern and Western Countries

**Josef Stubenvoll**

TBU – Technisches Büro für Umwelttechnik Dipl.-Ing. Josef Stubenvoll  
Pyhrnstraße 16, 4553 Schlierbach, Austria

In the presentation experiences with export of environmental technologies of TBU are summarised. TBU is an engineering company for engineering and consulting in the field of waste to energy plants with detailed know how for fluidized bed combustion and flue gas cleaning. The clients for engineering and consulting of waste to energy plants are mainly power generating companies or municipal waste incinerating companies. For fluidized bed combustion and flue gas treatment TBU usually acts as subcontractor of local boiler or environmental technology plant producers.

Application of modern environmental technologies for biomass power plants, waste incineration and flue gas cleaning started in Austria in the late seventies and early eighties of the last century. At that time Austrian companies mainly used Japanese and German technologies and some of the engineers of TBU were working in leading Austrian companies for environmental technologies such as SGP or VAI.

The demand for pollution control developed faster to more stringent standards than in other countries. Especially for waste incineration plants Austria was world-wide the first country having very low emission limits for different pollutants such as NOX, PCDD/F, heavy metals and HCl, HF and SO<sub>2</sub>.

The first application with the high standards was the reconstruction of waste incineration plant Spittelau in Vienna, which is nearly 20 years in operation and still state of the art.

For this plant the technologies had to be developed to new standards. This development and the application in some more Austrian plants were basis for an advantage on the European market for environmental technologies. Austrian companies exported environmental technologies especially to the high developed European countries like Germany and the Netherlands. Austrian technologies have been used for example for reconstruction of the world biggest waste incineration plant in Rotterdam and for the first German plant according to 17th BIMSCHV in Heidelberg.

With the personal experiences of application of environmental technologies of the eighties TBU was found in 1991 as engineering company. As consultant for waste incineration plants TBU had or has orders in Canada, Croatia, Czech Republic, Germany, Greece, Italy, Malta, Slovakia, Slovenia, Russia and Taiwan.

Meanwhile TBU has developed technologies for fluidised bed combustion of biomass and waste fuels in the range of 3 to 50 MW of fuel heat capacity, semi dry absorption reactors and scrubbers in the range of 10.000 to 230.000 Nm<sup>3</sup>/h.

Engineering for combustion and flue gas cleaning plants as subcontractor to producers has been exported to Australia, China, Czech Republic, Germany, Italy, Korea, Netherlands, Russia and Switzerland.

Employees of TBU are native speakers of different languages such as Croatian, German, Hungarian, Russian and Slovak. English is spoken by all and French by some Engineers.

Regarding the technical and the linguistic background TBU seems to be well prepared for export of environmental technologies to east and west.

## Jämtland County – Aiming at a 100% Renewable Energy Region

**Jimmy Anjevall**

Energikontoret Jämtland, Jämtland County Energy Agency  
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I will talk about the present energy situation in Jämtland County, which objectives we have for the future and finally what we are working with at the moment and what we plan to work with in the future.

- Jämtland County is situated in the very middle of Sweden. It is a very sparsely populated region and the numbers of inhabitants are continuously decreasing.
- All production of electricity is based on renewable energy sources and peat.
- A very large share of the heat production is based on biofuels. A pretty large share of the heat production is also based on electricity.
- The share of RES is increasing. That is mostly due to the increased share of biofuels. What is not so good shown is that the total use of energy has increased.
- Deliveries of gasoline and heating oil have decreased but diesel is increasing. Since 2004 there is 5% ethanol in the gasoline.
- The consumption of electricity has increased with about 10% from 1999 to 2004.
- There are reasons for Jämtland County to be proud of what has been achieved but we can absolutely not be satisfied. There is still very much work to do. Continued work with energy issues is needed for the climate issue and for the security of supply. Work within the energy sector also leads to economic growth and development in the region.
- The first regional environmental goals for the county were decided in 2002. During 2006 new objectives were outlined. The objectives were decided by the county administration in spring 2007.

## Determination of Renewable Energy and Greenhouse Gas Emissions Share from Waste Incineration

**Helmut Rechberger**

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New directives of the European Union will require operators of waste-to-energy (WTE) plants to report the amount of CO<sub>2</sub> that is generated by the combustion of fossil materials. Up to now the standard method for determining fossil CO<sub>2</sub> emissions from WTE plants is sorting of wastes into defined fractions of fossil and biogenic waste components and determining the carbon content of these fractions. From this the amount of CO<sub>2</sub> from fossil sources can be calculated. This practice is labour and cost-intensive and imprecise. Therefore it is usually carried out only once a year which provides just a momentum analysis of limited significance.

A new method is introduced that calculates the fossil CO<sub>2</sub> emissions from waste combustion based on standard operating data derived routinely from the WTE plant (e.g. volume of flue gas, O<sub>2</sub> and CO<sub>2</sub> concentration in the flue gas, steam production, amount of solid residues ...). These data are used to set up the energy and six mass balances that allow determining the amount of biogenic and fossil organic matter in the waste feed. The advantages of the balance method are: known uncertainty range of the result, temporal resolution of the result down to daily mean values, low implementation and virtually no permanent costs.

Currently the method is being implemented at four WTE plants in Europe with a collective waste throughput of some 1,000,000 tons. An overview on the operating experience of the balance method at these plants will be given. Furthermore a comparison between measurements with the balance method and an alternative approach based on the radiocarbon (<sup>14</sup>C) method will be presented.

## Precious Metals Recycling in a Global Perspective

**Matthias Buchert**

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The presentation will focus on the three main platinum group metals platinum, palladium and rhodium. Platinum group metals (PGMs) in catalysts reduce car exhaust emissions, increase the efficiency of industrial processes and play an important role in the manufacture of many products (e.g. electronic devices). Their primary production is restricted to just a few countries, above all Russia and South Africa. The primary production of PGMs gives rise, in part, to considerable environmental pollution. The recycling of platinum, palladium and rhodium is ecologically 10 to 100 times more favourable compared to primary production.

Due to high prices for PGMs, their recycling from scrap material can generally be performed economically and is already successfully practised in many application sectors. Since the environmental effects associated with recycling are very much less than in primary production, the greatest possible feedback of scrap material containing PGMs into the materials flow cycle makes sense from an ecological point of view. The presentation deliver an overview about the areas of application, materials flow, lifecycles and recovery rates of platinum group metals in Germany. The objective is to highlight serious shortcomings in the global recycling flows and to propose measures for improvement that will contribute to sustainable use of the highest possible share of secondary PGMs in meeting future demand.

Further improvements of efficient closed-cycle materials management structures concerning platinum group metals will be an important contribution to answer the negative impacts of the global "Resources Fever". The presentation will give an outlook about further potentials to reduce environmental pressures like the emissions of greenhouse gases.

## **INNOWATECH – an EU Project Aimed at Assessing the Effectiveness of Innovative and Integrated Technologies for the Treatment of Industrial Wastewater**

**Antonio Lopez**

Consiglio Nazionale delle Ricerche – Istituto di Ricerca Sulle Acque  
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The main objective of the INNOWATECH project is to investigate, assess and enhance the potentiality of promising technological options (i.e. technologies, processes and concepts) for the treatment of industrial wastewater with the specific aim to provide tailor-made solutions to end-users for a wide range of wastewaters. Such solutions will be essentially based on the integration of the investigated options and on technological improvements with respect to treatment system components, operation and control. The project's goals are:

- investigating and enhancing the performances of promising wastewater treatment options such as aerobic granulation, advanced oxidation processes (AOP) integrated with biological treatments and membrane-based hybrid processes,
- achieving fundamental and technological knowledge advancements necessary for advanced wastewater treatment application in different industrial sectors,
- assessing the economic and environmental sustainability of the considered promising wastewater treatment options,
- developing integrated tailor-made solutions for end-users in different industrial sectors,
- transferring the developed know-how to potential end-users inside and outside the project,
- favoring their actual implementation for enhancing the EU Water Industry competitiveness.

In order to achieve such goals, coordinated research activities will be carried out on the selected options treating different wastewaters. The experiences from such parallel activities will be merged to define tailor-made solutions for end-users in different industrial sectors. A major goal, in fact, will be the definition of treatment needs and framework conditions for a wide range of wastewaters based on the particular features of the options investigated. It might turn out that single processes have potential applications in areas which have not been investigated in the project and that even a combination of several of the considered options might be feasible in some industries.

The investigated options (aerobic granular sludge systems, AOP integrated with biological processes, membrane contactors, membrane chemical reactors) have been selected on the basis of their promising potentiality for treating wastewaters whose features are common to many and vast industrial sectors and/or because of their innovative treatment-concept. Appropriate wastewater treatment solutions for end users will be identified by means of reliable tools (e.g. life cycle assessment and costing as well as integrated pollution prevention) and proposed to potential end users and stakeholders inside and outside the project through a suitable dissemination strategy.

Strategic objectives:

INNOWATECH is aimed at providing effective technological solutions for the treatment of industrial wastewater. Such solutions are vital for supporting and enhancing the competitiveness of different industrial sectors, including the water technology sector, in the global market. The main expected results of the project are:

- new concepts, processes and technologies in wastewater treatment with potential benefits for the stable quality of effluents, energy and operational costs saving, and the protection of the environment,
- new sets of advanced standards for wastewater treatment,
- new methodologies for the definition of wastewater treatment needs and framework conditions,
- new know-how for contributing to enhancing the European (Water) Industry competitiveness,
- new procedures for the transfer of the developed know-how,
- new information supporting development and implementation of water legislation.

## Climate neutral - a concept for CO<sub>2</sub> reduction

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The envietech 2008, taking place at the "Austria Center" in Vienna. The exhibition is the first of its kind in Austria and to make it even more special, it will be "climate neutral". ClimatePartner Austria will calculate the exact emissions caused by the travelling of participants and exhibitors, use of energy, food etc. Consequently, those emissions will be compensated through an international climate protection project and therefore the entire event proves the ability of making a product and everything else climate neutral.

## Hydroelectric powerplant in Poza Verde, Guatemala



This project's goal is it to supply Guatemala with clean and reliable energy. CO<sub>2</sub>-emissions are reduced through suppression of demand for fossile combustibles from the national power supply system, which is heavily dependent on fuel oil, coal and diesel.

## Integration of Demand Side Measures into Energy Supply Contracting Models

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Energy Performance Contracting (EPC) projects - if implemented properly - have successfully delivered guaranteed savings since they were first established in Europe around 1995. Nevertheless, success is essentially limited to the public sector and spread very unevenly throughout Europe.

Besides requiring dedicated and persevering project developers, the EPC model itself imposes obstacles from a methodological point of view, especially if the cost baseline is difficult to determine or if frequent adjustments to the baseline are necessary due to changes in utilization of the building, the business or a production process.

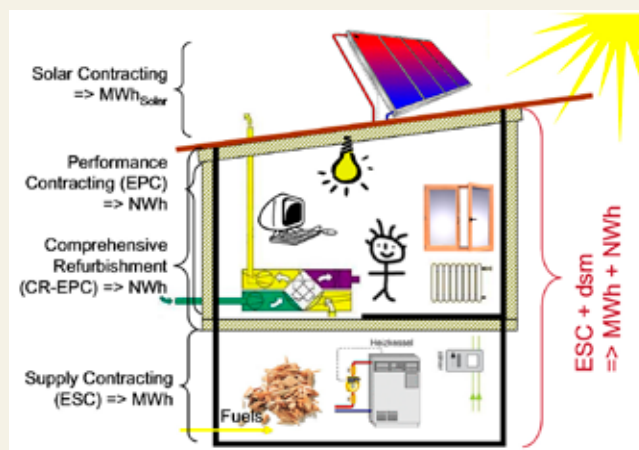
The latter problems are not encountered with the Energy Supply Contracting (ESC) model, because no baseline is needed to measure guaranteed savings. Further on, the ESC model is also common in other end use sectors such as industry or housing. The problem is that ESC measures are typically limited to the energy supply side not covering demand reductions in the building or the production process itself.

Based on this experience, the focus of this paper is on possible advancements of the ESC model with the objective of integrating demand side measures and energy saving incentives into the ESC model. The paper proposes 5 concepts labelled as:

1. Cost-oriented energy prices,
2. Supply-Contracting + simple EE-measures (ESC+EE „light“),
3. Supply-Contracting + comprehensive EE-measures (ESC+EE),
4. Supply-Contracting with shared savings (ESC+Shared Savings) and
5. Performance-Ct simplified (EPC „simple“).

An important issue is the discussion of possible quality assurance instruments and performance verification methods for the EE-measures implemented as a substitute for the savings guarantee in EPC contracts.

To conclude, we will report on existing and possible future applications of the new ESC+EE models and present a first expert evaluation of the concepts proposed.



Acknowledgement: Work for this paper is carried out in the framework of Task XVI „Competitive Energy Services“ run by the IEA (International Energy Agency) Demand Side Management Implementing Agreement (<http://dsm.iea.org/>). It is also based on the project “Energy Services for Industry and Commerce” funded by Austrian Research Ministry BMVIT

What different Energy-Contracting models deliver (Bleyl 2007)

### **Biomass - a reasonable Concept for a Sustainable Future?**

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The discussion on biomass was never a rational one: the question is quite complex, and too many and different economic interests are involved. In the beginning, biomass was praised as the most attractive and environmentally friendly alternative to oil given the latter's disadvantages. The European Union has hence encouraged the use of biomass as environmentally friendly solution and has set targets and standards for its use: A European directive called for the increase of biogene fuels to a share of 5,75% till 2010 and of 20% till 2020. Energy policy and environmental policy in the USA, India and Brazil point in the same direction.

The debate that followed has, however, brought to light the disadvantages of biofuel production. Several experts and politicians were suddenly calling for a moratorium on policy related to the promotion of biofuels. Within only a short time, biofuel had shifted from being a potential saviour for the energy crisis into a major threat.

A rational assessment is only possible on the basis of a more thorough consideration of the facts and empirical evidence. If the targets should be fulfilled as foreseen by the European directive, import becomes an issue: import from developing countries, for instance from Africa.

This solution is itself, however, not unproblematic: This could lead to an increased necessity to import food from Europe and the USA, or even to more starvation in Africa. Furthermore, the environmental and social standards are quite low. The farming of sugar cane is a high-risk business: It is only natural that this leads to the excessive use of fertilizers and pesticides.

This is the reason why for a sufficient supply of biomass new national and international policy initiatives are needed. Standards have to be set to ensure that biomass import does not affect the social structure and the environment in the producer countries. National and international policies must be coordinated at the sectoral level as well as horizontally with environmental and social policy.

## “Mureck Energy Cycle”

Efficient climate protection, safety and employment through decentralised generation and use of energy

**Josef Reiter-Haas**

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SEEG, Nahwärme Mureck and Ökostrom Mureck are operating a biodiesel facility, a biomass heating plant and a biogas clean power plant in Mureck/Austria to supply our region with renewable energy.

Rapeseed processing according to the cycle principle: “from the field straight into the tank”  
Approximately 500 farmers from the region are members of SEEG and cultivate oilseed rape. Then the farmers deliver the rapeseed to SEEG, which converts it to biodiesel. The biodiesel and rapeseed cake produced from the rapeseed supplied by each farmer is returned to the respective farmer for his own use. The rapeseed cake serves as protein feed.

Processing of used frying oil according to the cycle principle: “from the frying pan into the tank”  
Since 1994, SEEG has been the world’s first and only company to produce biodiesel from used frying oil. Communities as well as hotel, restaurant and catering enterprises are members of the cooperative. SEEG collects used frying oil and converts it to biodiesel which is used by the communities and public transport companies.

Generation of heat for the town of Mureck: “from the woods into the living room”  
Nahwärme Mureck GmbH operates a biomass heating power station. Two 2MW biomass heating furnaces, waste heat from electricity generation and a biogas peak load furnace provide the required energy input. 250 buildings are connected to this network. The connected load is approximately 7MW, corresponding to approximately 85% of the total heating demand in Mureck. Being connected to the local heating network is not only good for the environment, but also reduces the heating bill of the household by EUR800.00 per year compared with standard fossil oil heating.

Biogas: “total coverage of the electricity, heating and fuel demand of the Mureck region”  
To reliably cover the electricity demand, Ökostrom Mureck GmbH built a biogas “green electricity” plant with an electricity output of 8,000MWh per year and corresponding heating output. Following the installation of a cleaning plant in 2008, it will be possible to use the gas as fuel to drive combustion engines, too, utilising commercial fertiliser and re-growing raw materials as well as the by-products of biodiesel production as input materials.

Generating energy from the raw materials of the region offers the following benefits: environmental friendliness (45,000 tons of CO<sub>2</sub> emissions less per year), safety, convenience, value added, quality of life;

The Mureck Energy Cycle is a sustainable energy concept with a promising future. From the ecological, economic and social point of view, it sets an example that deserves to be imitated.

In 2001, SEEG was awarded the first prize – the World Energy Globe – and in 2006 it won the European Solar Award.

These activities make the town of Mureck “the most innovative community of Austria in 2007”.

## Solar Cooling

### Werner Pink

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The worldwide cooling demand is still increasing. Conventional cooling systems based on compression chillers are driven by electric energy. Providing this energy effects increasing CO<sub>2</sub>-emissions out of thermal power plants and grid overloads at the peak-times during summer. Beside the CO<sub>2</sub> emitted by the power plants the normally used refrigerants have a global warming potential up to 2000 times higher than pure CO<sub>2</sub>.

An interesting alternative to produce cold are thermally driven chillers. These machines are able to convert hot water into cold water by using heat as the main driving energy. Modern machines are able to work with hot water out of standard solar collectors – which makes sense: There is a good correlation of cooling demand and solar radiation and the energy is for free and environmentally friendly!

Keywords: thermally driven chiller, solar cooling, solar panels, CO<sub>2</sub>-reduction

## Biomass Gasification CHP for high efficient, decentral small scale applications

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**Purpose of the work:** The paper presents an overview about the advantages of the thermochemical conversion of solid biomass into a gaseous producer gas as an intermediate fuel to be used in an internal combustion engine for highly efficient utilization in decentralized power production in the small and medium power range (from 50 to several hundred kW electric power). Moreover the work shows latest results from the "CleanSt-Gas" - biomass CHP, based on staged gasification concept. Very low tar loads could successfully be realized in the raw producer gas of the Institute's CleanStGas gasification test rig. The results show different achievable producer gas qualities with respect to the gasification parameters and the results from efforts to increase the load capacity of the gasifier.

**Approach:** First results at the test rig of staged gasification showed a very good producer gas quality with respect to condensable organic fraction (tar). Due to further optimization of the test rig (pyrolysis reactor, partial oxidation chamber etc.) the power load of the test rig could be nearly doubled with the same producer gas quality. Recent work focuses on primary measures (within the gasification step) to reduce inorganic producer gas pollutants which are relevant to efforts in gas cleaning and for maintenance intervals at the IC-engine and the stability of the oxidation catalytic converter after the IC-engine.

**Scientific innovation and relevance:** With the staging of the process into separate reactors a heavy reduction of tar contaminants could be achieved by primary measures. The reached increased power load and the results from primary inorganic reduction is essential for a successful introduction to the market, because operating costs are decreased (little effort in gas cleaning) and the operational availability of the gasification plant is enhanced.

**Results:** The total concept of staged gasification with its very low tar load below the limits set by e.g. IC engines was realized, i.e. tar concentrations smaller than  $20 \text{ mg/m}^3$ . Furthermore, this excellent producer gas quality leads to possible reductions within the gas cleaning steps and the total plant is able to be operated in very stable conditions with very low total emissions. The present paper will give an overview on reached results relating process operation and quantified and qualified plant emission streams. Furthermore performed improvement strategies are exemplarily shown to give answers for the targeted reduction potentials for environmental issue impacting plant stream (ammonia conversion, organic and inorganic producer gas pollutants reduction by primary measures).

**Conclusion:** Biomass gasification is a promising CHP technology, due to its high electrical efficiency compared to other CHP systems in the lower and middle range of power. Tar contamination of the producer gas obtained by traditional shaft reactor systems with the demand for a costly gas cleaning has been the main obstacle for the successful introduction of the technology to the market. The heavily investigated concept of the CleanSt-Gas process reduces organic and inorganic pollution of the producer gas by primary measures. Therefore the technology is ready to be tested in long term field tests.

Key words: Biomass, Gasification, Staged gasification, CHP, organic and inorganic pollutants

## Wind farm - Kavarna

**Alek Arabadjian**

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1. GEO POWER OOD is Bulgarian-German Company, member of the German-Bulgarian Industrial and Trade Chamber that was established in 2003 to develop investment projects in the field of ecology and renewable energy sources.

By July 29th, 2007 GEO POWER OOD is an owner of 76 landing estates with an area of 5-15 000m<sup>2</sup> on the agricultural lands of the villages of Bulgarevo, St. Nikola, Hadji Dimitar, Rakovski and Poruchik Chunchevo, Kavarna Municipality, provided for proceedings and construction of wind farm with total installed capacity of 120 MW to 200 MW.

Since August 2006 GEO POWER OOD works in partnership with the energy company AES MAASTRICHT HOLDING B. V. – part of AES THE GLOBAL POWER COMPANY. As a result of the agreements achieved, AES and GEO POWER OOD established a new joint company AES GEO ENERGY OOD, which will acquire the rights on the project, developed so far by GEO POWER OOD and YOMI ENGINEERING OOD. The new company's goals are to finalize the procedures, and to construct and operate the wind farm with total installed capacity of 120 to 200 MW.

2. During the period 2003 – 2007 were started and partially carried out the necessary administrative and legal procedures for territorial development, assigning the terrains for construction of wing generators, preparation of EIA Report. We have organized a public discussion, monitoring studies of autumn and spring bird migration, and coordination of the project with all interested institutions. At the same time geological studies and operating projects for construction of wind generators, the substation 110/20 kV and power transmitting grids and roots have been accomplished.

Positive standpoint has been received from the competent authorities RloEW (Regional Inspectorate of Environment and Waters) – Varna

3. Since May 2nd 2004 our own measuring of the wind parameters has been carried out in the project region at an altitude of 31 and 51 m by German company WIND CONSULT, specialized in the field. The results and the analysis of the one-year measuring confirm the availability of sufficient wind potential for work of full value of the planned wind generators.

4. In September 2004 we submitted for examination to NEK EAD a Project for interconnection on stages of 120 MW capacity. Following to the meetings and discussions that had been carried out with the competent specialists from NEK EAD on June 24, 2005 we signed a Preliminary contract for interconnection on stages of the new capacity – 120 MW. Currently we have been working on contract update for interconnection of total installed capacity of 200 MW. We have already specified NEK's commitments regarding the construction of new substation and new cable routes 110 kV as a guarantee for the capability for interconnection of the provided capacity.

5. At present a Draft-Purchasing contract is being discussed with NEK EAD.

6. In June 2006 with Resolution No 013/28.08.2006 of SEWRS (State Energy and Water Regulatory Commission) was set the preferential price for compulsory purchasing of electric energy, generated by wind, which comes to 175 leva/MWh for electric energy generated at full effective power of WTG up to 2250 hours and 156 leva/MWh for electric energy generated at full effective power of WTG over 2250 hours.

7. With the latest amendments of the Energy Law has been adopted the condition for compulsory purchasing of energy generated by renewable energy sources at preferential prices over 12-year period, which enables the realization of similar projects with regard to the certainty of financing institutions.

8. Following a thorough research was signed the preliminary contract for delivery and assembling of wind turbines, selected to ensure the best usage of the wind potential in the region as well as to best fit the investors' production program.

The investment amount for project realization comes to about 600 million leva.

After project capacity commissioning, we expect the produced eco energy to offset about 500 000 tons of carbon emission per year. Over the exploitation period of the commissioned capacity over 10 000 000 tons carbon emissions will be saved.

Investment project for generation of energy by wind with total installed capacity of 200 MW on the land of the villages of Bulgarevo, St. Nikola, Hadji Dimitar, Rakovski and Poruchik Chunchchevo, Kavarna Municipality has been initiated in pursuance of Directive 2001/77/EO of the European Parliament and European Council, dd. 27 September 2001, the obligations under the Kyoto protocol for reducing the harmful emissions in the atmosphere, the National Energy Strategy of the Republic of Bulgaria, the latest supplements to the Energy Law in its part regarding the stimulation of energy generation from renewable sources and co-generation.

The project is real token of the world's strive for complete utilization of renewable energy sources' potential and of the approved in March 2007 by the European Council European Energy Policy for 20 % harmful emissions offset and increase of renewable energy share up to 20 % by 2020.

## Vanadium Redox Flow Battery Improved Technology

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The vanadium redox flow battery in its present form was developed by Skyllas-Kazacos at the University of New South Wales in the 1980's.<sup>1, 2</sup> An improved, multiple-stage layout of a 10 kW, 60 kWh vanadium redox flow battery is presented. The system is compared and contrasted with one utilising a conventional layout.

Flow batteries are unique among rechargeable batteries in being able to effectively decouple the amount of energy stored with the maximum power output: tank size determines the energy, total electrode area the power. The vanadium redox flow battery has emerged as one of the most favourable types of flow batteries for a number of reasons, including the lack of cross-contamination that troubled many earlier systems such as the Fe-Cr redox battery.<sup>3</sup>

The membranes that divide the two half-cells allow transport of one ionic species (typically H<sup>+</sup>). However, they cannot completely hinder movement of the electroactive species. In the case of redox batteries with dissimilar electroactive species, such as the Fe-Cr system, this leads to a gradual mixing of the electrolytes, with consequent decrease in performance. Because the vanadium redox flow battery employs the same element in both electrolytes, albeit in different oxidation states, there is no cumulative loss in performance, just an effective reversible self-discharge current.

The self-discharge that occurs in the vanadium redox flow batteries is limited to the electrolyte volume in the cells. Electrolyte stored in the tanks undergoes no appreciable self-discharge. The pumps also use power from the battery and may be considered as another source of self-discharge. It was found previously that the energy efficiency (full cycle) of the conventional vanadium redox flow battery was rather low, due to these losses, when the average power was low, Fig. 1.4 Taking these considerations into account the layout of a 10 kW vanadium redox flow battery was modified to reduce the self-discharge currents. The battery was comprised of 5 strings of 40 cells each in 3 separate fluid circuits (10 kW, 48 V system), Fig. 2. The first fluid circuit, containing a single string, was always actively pumped with electrolyte and electrically connected to the charger and load. The second and third fluid circuits contained 2 strings each and were only actively pumped and electrically connected when the bus voltage reached preset limits.

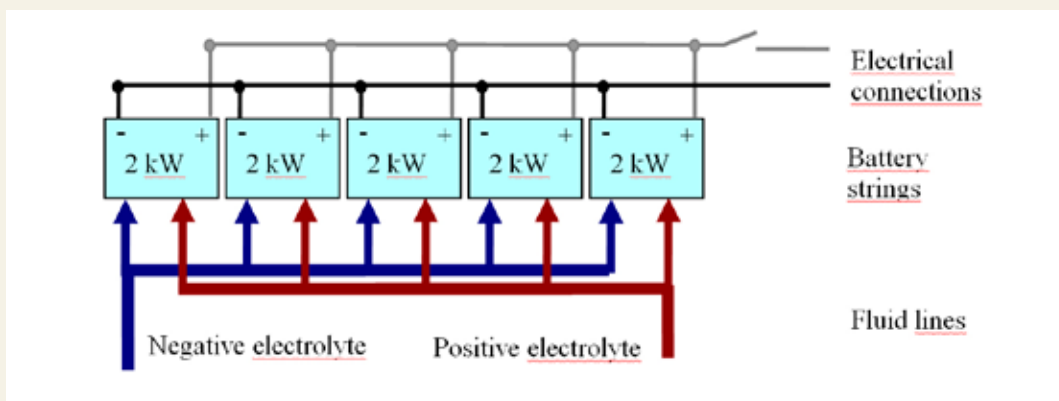


Figure 1 Conventional vanadium redox flow battery layout with 5 x 2 kW battery strings arranged in a single stage

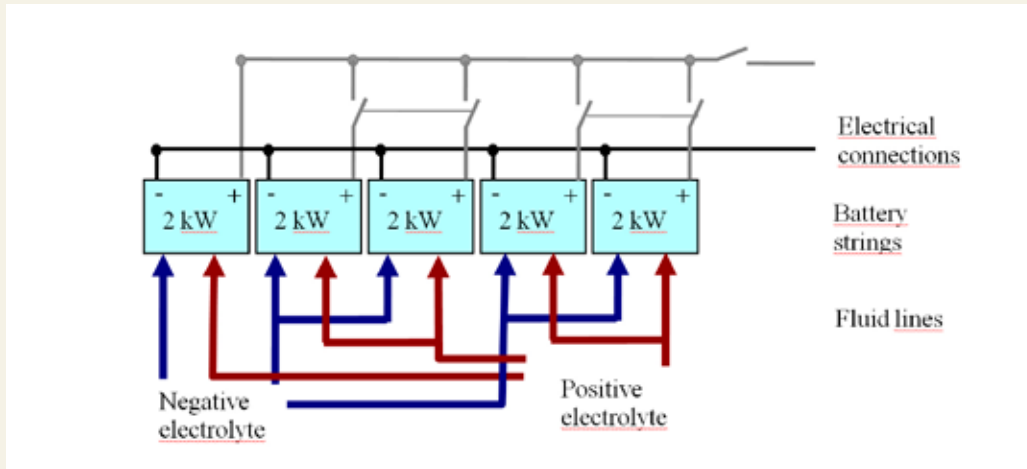


Figure 2 Novel, multi-stage vanadium redox flow battery layout with 5 x 2 kW battery strings arranged in 3 stages

When the circuits were in “standby”, i.e. not actively pumped and electrically connected, the self-discharge was limited to the small volume of electrolyte in the cells. There was also a saving in the pumping energy, because 3 pairs of small pumps were used in place of 1 pair of more powerful pumps. Therefore, for charge-discharge regimes that rarely required full power a considerable improvement in energy efficiency could be made, Fig. 3.

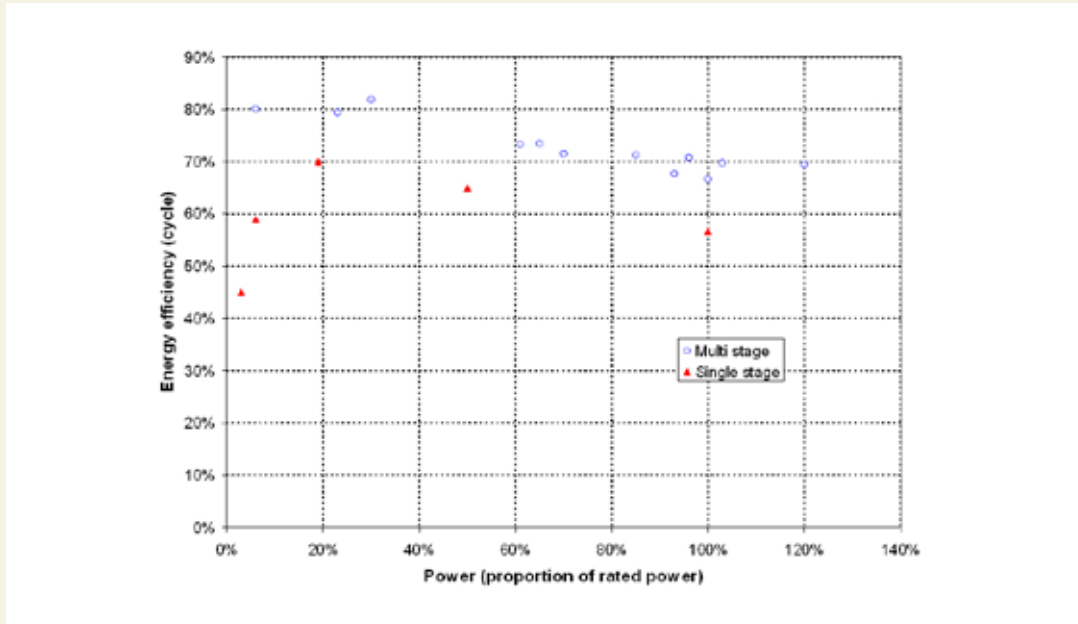


Figure 3 Energy efficiency of vanadium redox flow batteries with conventional (single stage) and novel (multi stage) layouts

## Solar energy 24 hours a day

Johann Schweiger

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The whims of nature make a constant energy supply from renewable sources hard to realise. The innovative energy storage solution from Cellstrom makes that energy available as it is required.

Clean, environmentally friendly, safe: this is how energy supply from regenerative sources should be. Together with climate protection, but not less important, the desire for security of energy supply speaks for the use of renewables. Unfortunately many of these energy sources, for example solar or wind, are directly or indirectly influenced by the weather or time of day and are thus not always available. On the other hand, under ideal conditions a very large amount of energy may be available for a short time. Exactly these fluctuations make it difficult to make full use of renewable sources. Powerful storage systems, which can equalise the fluctuations in energy supply, are key to efficient use of these resources. The Austrian company Cellstrom GmbH has specialised in the supply of innovative solutions integrating both photovoltaic and other renewable sources with energy storage systems.

There are a range of energy storage devices on the market, which may be divided roughly into four groups: electrostatic (capacitors, supercapacitors); electromechanical (pressurised gas, pumped hydro, flywheels); electro-dynamics (superconducting magnets – SMES); and electrochemical (various batteries, fuel cells, flow batteries). Each of these technologies is at a different stage of development and suited to particular applications.

Why have we chosen to pursue the vanadium redox flow battery technology?

The vanadium redox flow battery is ideal for applications demanding long discharge times and high cycle lives. For use in a stand-alone energy supply system with renewable sources, the vanadium redox battery has the following advantages:

- Long lifetime (more than 10 000 cycles)
- Very robust against deep discharge
- High energy content
- Rapid recharge
- The state-of-charge can be exactly determined on demand
- Competitive total lifetime costs

The high reliability and low maintenance requirements make this technology well-suited to RAPS (remote area power systems) and emergency backup supplies. These may be implemented in remote locations, where no grid exists, or for grid-independence within urban environments.

### The Solar Filling Station

Cellstrom's so-called "Solar Filling Station"; a World first in CO<sub>2</sub> free, mains independent and market-ready mobility concept, was developed together with SOLON AG, one of the largest European producers of solar modules and leading provider of photovoltaic systems. This use of solar energy for inner city transport demonstrates that, without any loss of performance or decrease in our accustomed living standards, 100% CO<sub>2</sub> free mobility is available today from Euro 0.09 per km. The "Solar filling station" erected outside of the Vienna town hall during the transport festival was greeted as a welcome development.



*Conceptstudy CO<sub>2</sub>-free mobility  
[architects: baronmüller architekten /  
picture: www.marcusbredt.de]*

## Opportunities for the Agricultural Sector from Renewables, Biofuels and Climate Change

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As climate change mitigation becomes more urgent, a high potential exists for the agricultural sector to contribute to greenhouse gas emission reductions. For example providing feedstocks for transport biofuels is causing much debate over the cost, the CO<sub>2</sub> savings, and the competition for water and land with food and fibre production. Second generation biofuels may be a solution but commercial reality remains some way off even at current high oil prices. The availability on farms of wind, waterways, solar energy and biomass supplies can provide revenue earning opportunities for landowners from their capture for the distributed generation of heat and power. Soil carbon uptake and plantation forest sinks also hold promise for helping the world reach an acceptable atmospheric CO<sub>2</sub> stabilisation level. Achieving the much cited 2°C, 450 ppm CO<sub>2</sub> equivalent, stabilisation level requires greenhouse gas emissions to peak in the next decade. This will be hugely challenging, if not impossible, and the agricultural sector must play a leading role. We have the technologies, we have the money for investment, but we no longer have the time.

### Funding strategies for projects in environmental technology and renewable energy

**Uffe Bundgaard-Jørgensen**

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The lecture will present tools and services available to overcome many of current obstacles for financing and also present a new “one-stop” funding structure, which is currently being created in order to facilitate combination of early stage financing with direct access to later stage financing.

Future eco-innovation (environmental technology and renewable energy) projects will often build on public-private cooperation between major European corporate players within this industry, and players within the fields of research, innovation management, innovation financing, regional development, business support services. Formulating a business strategy which appeals to investors in such a complex context is very difficult. This partly explains why so many excellent technology projects may get stranded because of lack of proper financing.

With respect to focus areas, we can currently conclude that in addition to the currently well known technologies related to energy savings (insulation, led-bulb, CHP, energy management and the like), waste treatment, wind and bio-mass, a number of new technologies are close to practical technical and in the longer run also commercial market break through. These areas are among others fuel cells, solar cells/energy, 2 generation bio fuel, geothermal, wave/tidal energy, and various hybrid technologies for the transport sector,

One of the big hurdles for obtaining financing for such project is associated to the fact that within each of these sectors it is essential not only to have the best technology/solutions. It is equally important to know how the market functions, which price incentives/barriers there are in the market, and how an eventual technology can be „up-taken“ in already distributed solutions. The real barrier for a successful commercial implementation of a new technology is often not the technological solution in itself, but barriers for its integration in already existing systems/appliances, and uncertainty regarding the future feed-in tariff structure and regulatory framework.

Another big hurdle for projects within the eco-environment sector is financing. In the eco-environment sector most projects are rather big, needs substantial investment in prototypes and often also have long time until commercial market break-through can be achieved. This means that most projects will need to go through a number of “Rounds of Financing” before reaching break-even, and the projects are therefore exposed to all the risk of failing to obtain the next round of financing.

Together these two hurdles represent a rather poisonous mixture for the investor who shall finance the first phases.

## Financing of renewable energy projects – The equity investor’s perspective

**Andreas Glatzer**

RENERGIE Raiffeisen Managementgesellschaft für erneuerbare Energie GmbH

RENERGIE Raiffeisen Managementgesellschaft für erneuerbare Energie GmbH is a 100 % subsidiary of Raiffeisen-Holding Niederösterreich-Wien reg. Gen. m.b.H.. The foundation of RENERGIE Raiffeisen-Holding marks the entry of Raiffeisen-Holding into the energy business and especially the renewable energy business. The strategic goal is the production and marketing of electricity, heat and biofuels from renewable energy sources. RENERGIE’s countries of interest are –besides Austria- those, where the Raiffeisen-Group is already present, i.e. the Central and East European countries.

Special features of renewable energy projects from the perspective of the equity investor are presented as well as alternative financing possibilities.

Especially the risks of these renewable energy projects during the different project stages are analyzed from the equity investor’s point of view. The possibilities of sharing or transferring of risks to other partners are shown.

## Renewable Energy from Dairy Production

**Senad Novalin**

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Whey is a co- or by-product of the dairy industry and consists of roughly 93% water, 4.5 % lactose, whey proteins and minerals. The world production is enormous and is estimated to be at 100 million tons per year. Despite continuing efforts to find uses for this by-product, only a small part (approx. 5-10%) is used for human food. Approximately 60% is being used for animal feed and the rest is disposed off as sewage. Since cheese consumption is increasing around the world and the use as animal feed is not a satisfying utilisation, one can assume that the whey problem is getting worse. The Austrian dairy company Landfrisch, the company Gradient process technology and the University of Natural Resources and Applied Life Sciences, Vienna have developed a concept in which whey from cheese production is turned into green electricity and heat on industrial scale. Moreover the separation of valuable substances namely whey proteins and especially calciumphosphate was realised too.

To produce energy the whey is treated by anaerobic digestion in a so called Upflow Anaerobic Sludge Blanket (UASB) reactor. The whole process line consists of:

- pre-treatment
- buffer tank
- UASB reactor
- desulfurization
- biogasholder
- flare
- block-type thermal power station
- integrated system of energy usage (electrical and thermal energy)
- waste water and sludge disposal management.

The whey treatment capacity is 180 m<sup>3</sup> per day. The daily production of biogas is around 5 000 m<sup>3</sup>. The block-type thermal power station delivers around 1.1 MW (500 kW electrical and approx. 600 kW thermal) power. The thermal energy is entirely used in the cheese production line, thus the energy efficiency is above 80%. In the end the installation helps to reduce the CO<sub>2</sub> emission at 2 000 t per year.

## Production of Agrobioalcohol from Rice Flour

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The levels of consumption of petroleum are in increase due to the scenes of economic growth in the East of the planet; this has generated that many devoid petroleum countries, look for new alternatives. In addition, the environmental problems generated by CO<sub>2</sub> originating emissions to a large extent of the combustion of derivatives of petroleum, have contributed to the global heating, requiring solutions to medium and long term. They are in the renewable power plants that contribute to the diminution CO<sub>2</sub> or no generation and other injurious gases that deteriorate to our planet earth.

This study raises the use of the broken rice, for the production of AGROBIOETANOL, this proposal is based on preliminary studies of the integral use of the rice; which is one of cereals of greater production at world-wide level, that still displays possibilities of increasing its production to world-wide level.

One sets out to produce rice flour, for the production of hydrolizates of high maltose content by enzymatic route; later to ferment these hydrolizates in presence of yeast with the purpose to produce bioetanol.

The proposed methodology displays several strengths; the main one is the advantage to use the subproducts of rice, for the production of enzymes required in the transformation of the fermentable sugar flour; the other advantage is about the no requirement of a plant of starch production.

The preliminary studies at level pilot have allowed the evaluation of the enzymatic production of hydrolizates from the rice flour. The liquefaction of the rice flour was made in the presence of bacterial  $\alpha$ -amylase, to pH = 6,2, T=90°C during two hours, for an equivalent dextrose (DE) of 11,00%, the saccharification in the presence of amyloglucosidase during three hours, to pH=5.0 and T=60°C; for 49% DE, the maltose concentration was of 24%. This hydrolizate with high %proteins, aminoacids and salts; will be put under fermentation in the presence of yeast. The composition of the hydrolizate one altogether with appropriate micronutrients, can constitute in favorable means for the fermentation in the presence of *saccharomyces cereviceae*, would be reflected in a high production of bioetanol.

Key words: Bioetanol, fermentation, hydrolizates, liquefaction, saccharification.

### Protein based Materials: A new Opportunity for the Utilization of Protein rich Co-product of plant Bio-refineries

**Stéphane Guilbert**

Unité Ingénierie des Agropolymères et Technologies Emergentes,  
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Since the 1980s, research programs and research and development projects on high value bioproducts based on proteins have boomed as a result of a larger availability of plant protein as co-products of biofuels production (proteaginous cake meal / diester production and wheat or corn gluten meal / bioethanol production).

Meal protein concentrates and wheat or corn gluten meal are rich in protein, inexpensive and widely available. They are an interesting source of functional industrial bioproducts (such as micro-nutrients, hydrolysates, biologically active compounds, surfactants,...) and of functional materials with original and specific properties.

Homogeneous, transparent, strong, water resistant, highly permeable to water vapor and highly gas selective protein based materials have been obtained either by „casting“ techniques or by „thermoplastic processing“. Depending on the density of hydrogen bond versus covalent bonds (e.g. disulfure bonds), the behavior of the end products resembles that of thermoplastic or elastomers (rubber-type) materials. It is important to notice that physically induced treatments has similar effects on protein structuration than chemically induces ones. In addition the activation energy of thermally induced cross linking is strongly reduced when mechanical energy is applied.

Formulation of blends, composites (protein/lipidic compounds, protein/paper, protein/other biopolymers such as PLA as well as proteins/fibers of cotton, sisal, coconut, straw, wood particles), or nanocomposites (protein/nanoclays or nanofillers) have given good test results and could be used to modulate protein based materials mechanical and transport properties.

Protein-based materials have lower mechanical properties than reference materials such as low-density polyethylene or plasticized PVC, but the addition of fibers (composite materials) can considerably improve them. Gas ( $O_2$ ,  $CO_2$  and ethylene), vapor ( $H_2O$ , aroma compounds,...) and solute (biocides, antioxidants, phytochemicals, bioactive compounds, ...) barrier or release properties are very unique and original thus paving the way for potential applications in the field of respiring, gas selective or active materials for food, agriculture (e.g. coated seed), pharmacy (drug delivery) and cosmetic industries.

The environmental performance of wheat gluten materials was conducted following the life cycle analysis methods of the ISO 14040 family. The results were very positive (energy use=10 MJ/ kg and emission of green house gasses=0.72 kg  $CO_2$ -eq/ kg). Both values are very low compared to starch or PLA based biodegradable polymers.

## Drying Vegetables and Fruits using Scrap Nitrogen of steel-making Plant

**Liu Zhongdong**

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This study discussed the drying technology of vegetables and fruits using scrap nitrogen of steel-making plant. Detection results of the nutritional composition show that vitamin C retention of the dried vegetables and fruits are high. Scrap nitrogen of steelworks as renewable energy is significant for energy saving in drying vegetables and fruits.

Keywords: renewable energy, scrap nitrogen of steel-making plant, drying media

## Energy Efficiency in the Building Sector: The ECO-BUILD Project of the European Commission

**Michael Schmidt**

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The building sector is at present responsible for more than 40% of the EU energy consumption. There are technologies already available, which could substantially improve (up to 30%) the energy performance of buildings, reducing the conventional energy demand in new and existing buildings and substantially contributing to reduce energy intensity, through combined measures of rational use of energy and integration of renewable energy technologies.

With largely stable population numbers in Europe and a steady increase of building space per person (both home and office) the overall energy consumption of buildings is bound to increase without groundbreaking technological advances. Cost efficient technologies such as improved insulation have been very effectively employed during the last two decades and have prevented a dramatic increase in energy use for heating purposes. Even though there will be further improvements of those technologies and the process of their use for the refurbishment of old buildings is by no means completed the challenge of the coming years will be to introduce a new generation of technologies that are capable of producing a much more profound impact on the energy consumption by and energy generation of buildings.

Recent progress in material sciences, semi-conductors (e.g. white LEDs), decentralised electricity generation (e.g. fuel cells and photovoltaic), heat pumps, heat insulation, geothermal energy, heat recovery and the thermal use of renewable energies suggests a large potential for improving the energy performance of buildings but hitherto only a few of those scientific advances have found their way into the building sectors. Some of them are of course still under development but in many cases those technologies are already being used successfully in other sectors of the economy or in certain countries.

The ECO-BUILD project provides an overview of the internationally most advanced concepts and technologies for Eco-buildings, best practice solutions for implementing those concepts and an assessment of the potential of and problems faced by different sets of policy measures adopted at the European and national levels.

## An environmental fuel – solid rice husk fuel

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Taking rice husk, the by-product of rice processing, as the raw materials, produces an environmental bio-fuel i.e. the solid rice husk fuel (SRHF).

The thermal value of SRHF is between 14.6 ~ 16.0 MJ / Kg, the thermal value of coal is between 12.5 ~ 27.2 MJ / Kg. The thermal value of each ton of SRHF is equal to 0.7 ~ 1.0 ton of coal.

The content of carbon, sulphur, nitrogen, hydrogen in SRHF are lower than that in coal (table 1), especially sulphur.

Burning SRHF instead of coal with a industry boiler, an actual examine results show that (table 3) the exhaust quantity of smoke dust, the exhaust density of smoke dust, the exhaust quantity of SO<sub>2</sub>, the exhaust density of SO<sub>2</sub> are much lower than that of burning coal. When burning SRHF, the exhaust quantity of SO<sub>2</sub> is 6.67% of the coal, the exhaust density of SO<sub>2</sub> is 8.45% of the coal, the exhaust quantity of smoke dust is 64.29% of the coal and the exhaust density of smoke dust is 30.07%.

The SRHF burns fully, coal burns un-fully. After burning, the waste residue of SRHF is around 20%, the waste residue of coal is between 25% ~ 60%.

SRHF burning exhausts a great number of SO<sub>2</sub> and CO<sub>2</sub>, which pollutes environment seriously. Comparing the pollution created by burning coal, SRHF is an environmental fuel.

Table 1 Components of coal and the SRHF

	Carbon %	Sulphur %	Nitrogen %	Hydrogen %
Coal	60 ~ 95	0.28~10	0.5 ~ 3.0	2.2 ~ 6.5
SRHF	381,500	0.109	0.566	3.82

Table 2 Comparison of burning results on coal and the SRHF

		Coal	SRHF
exhaust quantity of SO <sub>2</sub> :	kg/h	3.0	0.2
exhaust density of SO <sub>2</sub> :	mg/Nm	3636	307
exhaust quantity of smoke dust:	kg/h	0.28	0.18
exhaust density of smoke dust:	mg/Nm	384.7	143.6

## Ozone cleaning in place (CIP): Cleaner technologies for environmental sustainability of food industries

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Keywords: CIP; wastewaters; ozone; food industry

Cleaning and disinfection (C&D) are key operations in food industry for safety reasons but they produce a significant environmental impact in terms of water consumption and production of wastewaters. Typically, cleaning and disinfection wastewaters contain organic matter from product remnants and removed deposit soil, along with cleaning and disinfecting solutions so high or low pH values and high conductivities are also typical. This is stated at the Reference Document on Best Available Techniques in the Food Drink and Milk industries but almost no in-process data is reported. Furthermore, most care areas rely on a range of chemicals such as chlorine, quaternary ammonium compounds, bromine or iodine products. Health and environmental concerns are supporting the need for alternative sanitation technologies.

The IPPC Directive encourages clean technologies solutions and pollution prevention approaches rather than end of pipe treatments. Ozonecip is a demonstration project funded by the EC under the LIFE-Environment Programme. Its objective is the reduction of the environmental impact of cleaning operations through an innovative technique consisting on the use of ozone as an alternative sanitising agent instead of traditional chemicals.

An analysis of the different factors involved in an ozone based CIP system has been performed through state of the art studies of both CIP and ozone generation technologies, environmental data related to in-process operations have been obtained in collaborating industries of the winery and dairy sectors, a pilot plant has been designed and constructed to perform comparative trials of conventional and ozone based cleaning protocols. The expected results of ongoing tasks are environmental indicators of water and energy consumption, wastewater quality and cleaning and disinfection efficiency of Ozone based cleaning versus conventional protocols. Among the food industries cleaning procedures, CIP is considered as a Best Available Technology (BAT) in the European reference documents and "Ozonecip" technique is expected to be more advanced than the BATs described.

## The Austrian Biomass Action Plan – An Economic Assessment of Impacts and Trade-Offs from Bioenergy Use in Heat, Electricity and Transportation

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The Austrian Biomass Action Plan sets ambitious targets for using bioenergy as a substitute or blend for fossil fuels, i.e. specific targets are set for heat, electricity and fuel for transportation.

Bioenergy is considered to be one of the most viable renewable energy carriers able to mitigate energy-related greenhouse gas emissions, having at the same time a significant potential to secure energy supply. Therefore, the Austrian government pursues ambitious targets *inter alia* for biofuel use, i.e. 10% of the total fuel consumption in 2010 and 20% in the year 2020. These targets are well beyond the scope of what the European Directive on the Promotion of Biofuels stipulates. In order to implement these targets a substantial increase in the production of relevant feedstocks will be necessary. These additional demands will have to be met either on the basis of the national land resources, through imports of feedstocks for local processing, or through biomass fuels from international markets. Of course, this will have an impact on domestic agricultural production patterns and, consequently, will entail economic impacts in terms of altered relative prices.

Our paper assesses firstly, the economic and efficiency potential of producing feedstocks for bioenergy production domestically and, secondly the economic impacts of implementing the set targets in terms of CO<sub>2</sub>-emissions reduction and macro-economic impacts. Output, investment and employment reactions will be investigated for main sectors of the economy. For this purpose we apply an agricultural and land-use model as well as a disaggregated macroeconomic model for the Austrian economy. The agricultural model has been developed for the purpose of this study. Both models are coupled to generate the assessment. Overall results are positive regarding the growth in income, employment and investments but effects for different economic sectors vary widely.

## Combined photo-Fenton/biotreatment for treatment of saline pharmaceutical wastewater

**Wolfgang Gernjak, Sirtori C., Zapata A., Oller I., Maldonado M.I., Malato S.**

CIEMAT-Plataforma Solar de Almeria,  
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Among the Advanced Oxidation Processes (AOPs), the photo-Fenton system has been shown to be the most promising for the remediation of contaminated water. Moreover, photo-Fenton driven by solar radiation is of special interest regarding lowering costs and enhancing the environmental sustainability of the technology. The major drawback of AOPs is that their operating costs exceed those of biological treatment. Nevertheless, the use of AOPs as a pre-treatment step to enhance the biodegradability of waste water containing recalcitrant or inhibitory pollutants can be justified if the resulting intermediates are easily degradable by micro-organisms in further biological treatment.

The present communication will present pilot-plant results of the treatment of highly contaminated wastewater from a pharmaceutical industry (COD 17 g/L, salinity 25 g/L) by the combination of solar photo-Fenton and SBBR treatment. Both treatment options (first photo-Fenton, then SBBR and the other way around) will be discussed.

This research was performed within the framework of the INNOWATECH project [FP6-2005-Global-4, contract 036882].

## Combining Advanced Oxidation Processes and Biological Wastewater treatment

Wolfgang Gernjak<sup>1</sup>, Malato S.<sup>1</sup>, Pulgarín C.<sup>2</sup>, Mascolo G.<sup>3</sup>, Pollice A.<sup>3</sup>, Vogelsang C.<sup>4</sup>, Plosz B.<sup>4</sup>, Lopez A.<sup>3</sup>

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Conventional biological wastewater treatment plants are not effective when industrial wastewaters have to be treated due to the high COD load and the presence of recalcitrant compounds. This drawback becomes particularly critical when a significant concentration of non biodegradable toxic compounds is also present rendering the wastewater itself toxic to the microorganisms responsible for the biodegradation. In such instances, environmental regulatory requirements can be achieved by Advanced Oxidation Processes (AOPs) applied as pre- or post-treatments.

This contribution presents the joint research efforts of researchers from Spain, Switzerland, Italy and Norway within the INNOWATECH project (FP6-2005-Global-4, contract 36882) regarding the coupling of AOPs with biological treatment.

Among the investigated technical options are:

- Combining Solar photo-Fenton treatment with SBRR reactors to treat pharmaceutical and pesticide industry wastewater
- Combining O<sub>3</sub> and UV/H<sub>2</sub>O<sub>2</sub> with MBR to treat pharmaceutical industry wastewater
- Combining O<sub>3</sub> and UV/H<sub>2</sub>O<sub>2</sub> with biofilm reactor to treat landfill leachate

## Specifications and quality control of biodiesel in Romania

**Boris S. Gaivoronski<sup>1</sup>, Mario Bernardini<sup>2</sup>**

1 Bioterpena Sistem S.R.L., Str. Humulesti nr.4, 052263 Bucharest, Romania

2 C.M.Bernardini - Rome, Italy

Biodiesel is a growing renewable fuel that offers many advantages over conventional diesel. Regulations are being put into place in countries around the world to encourage the use of biodiesel either in its pure form or as a blend component. The quality of biodiesel fuel is important to ensure good engine performance. Filter clogging, poor cold flow, and engine damage may result if the biodiesel quality does not meet the necessary limits for contaminants and residual reaction. Adequate testing performed on an ongoing basis can ensure uninterrupted production and a compliant final product, satisfying our need for energy, while reducing the burden on the environment.

Quality of biofuels is critical to performance and acceptance in the market in Romania. Standards-setting organisations in Europe (EN 14214) and the United States (ASTM D-6751-03) have designated metrics for biodiesel quality.

## **BIOTERPENA – RCC, a new reactor for fast biodiesel production**

**Boris S. Gaivoronski<sup>1</sup>, Mario Bernardini<sup>2</sup>**

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2 C.M.Bernardini – Rome, Italy

An increasing for alternative fuels especially because of the crude petroleum reserves are dwindling. Also, research on alternative fuels is essential for increased energy security. BIODIESEL is a renewable, biodegradable and nontoxic fuel.

At present, biodiesel is produced with the required energy by heating accompanied by mechanical mixing. The most common method for producing biodiesel is transesterification of triglycerides or fatty acids with an alcohol in the presence of a strong catalyst (acid, base or enzymatic). Use a controlled cavitation reactor type BIOTERPENA – RCC, a biodiesel yield in excess of 99% and to decrease time and temperature reaction to 30-35°C.

The intelligent monitoring system developed by our team eliminates human factor errors in determining time of reaction and quantity proportion of product and reactant. No methanol recovery is needed.

# Poster - Abstract

## Renewable Resources and Recycling for Sustainable Development

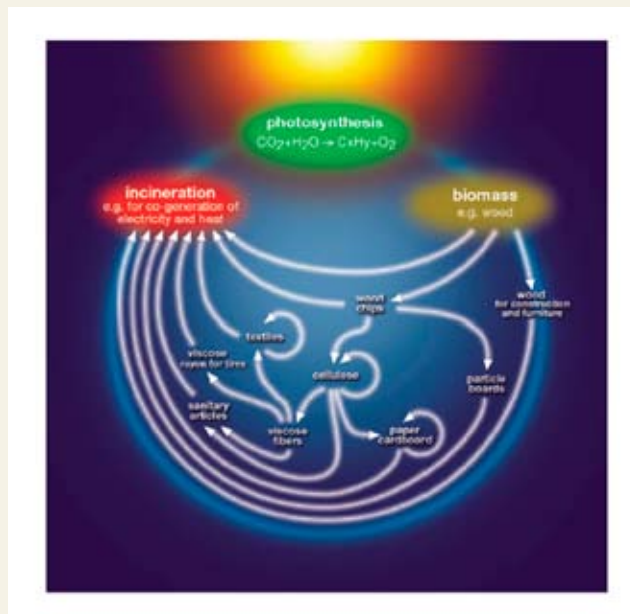
Franz Neubacher

UV&P Umweltmanagement – Verfahrenstechnik Neubacher & Partner Ges.m.b.H.  
Lassallestrasse 42/12, 1020 Vienna, Austria

Waste management is an integral part of environmental protection, of protection of human health and welfare and of sustainable economic development.

UV&P are the leading Austrian Consulting Engineers for development and implementation of

- Waste management plans for large municipalities and for major industrial sectors
- Waste sorting and mechanical processing for recovery of specific waste streams
- Recycling and utilization of waste materials (e.g. rubber, steel, and textile fibres from tires)
- Waste incineration facilities with highest environmental standards and energy efficiency



Controlled incineration of waste is – according to the proven state-of-the-art in Austria – a very necessary part in sustainable development of modern civilization and environmental protection. Our projects demonstrate the environmental quality of modern facilities for treatment of waste and recovery of energy.

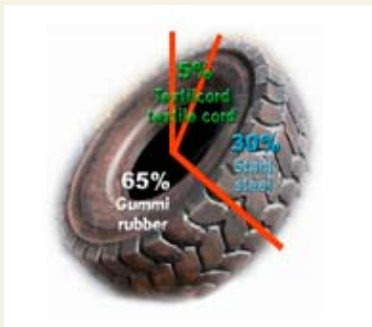
## State-of-the-art scrap tyre recycling

10 years of research, development and a change of approach have paid off.

**Thomas Danner**

ART Asamer Rubber Technology GmbH

Unterthalhamstraße 2, 4694 Ohlsdorf, Austria



In January 2003 the first Austrian recycling plant for scrap tyres and used rubber started producing, providing for non-polluting production in closed operating shops and attaching great importance to air pollution control, minimum noise development and numerous safety measures. The tyres are supplied direct from the scrap tyre repository and are precrushed for recycling. In the granulating lines arranged downstream the components steel and textile cord contained in the tyres are separated from the rubber, which is processed into granules of highest purity and various grain sizes.

Part of the granules is ground to high-grade rubber powder of extreme purity and grain sizes between 100 µm to 600 µm at a temperature below - 100° C, that is at glass

We see things in a different way...

... and turn scrap tyres into valuable rubber granules and rubber powder!

Versatility of application

In road construction:

Rubber granules of scrap tyres are manufactured into "rubber asphalt" that ensures technical advantages such as

- a substantial reduction of noise development
- improved grip
- improved durability
- reduced thickness of surface dressing

Thus it is supreme to conventional asphalt mixtures in terms of efficiency and safety.

In the car industry:

Rubber powder is used for the production of

- bumpers, panels, ...
- dashboards, pigeon holes, ...
- new tyres

For an improved quality of life:

Rubber powder and/or rubber granules is one of the components used for making

- plastic coating, plastic mats, protective mats for platform roofs
- insulating boards, floor coverings, soles
- children´s playgrounds
- sports field construction
- rubber mats for livestock breeding
- oil binders, etc.

## **Analysis of Reduction plan of CO<sub>2</sub> emission for transport sector of Pakistan (Case study of Karachi)**

**Khan Mohammad Brohi**

Department of Mechanical Engineering, Mehran University of Engineering & Technology, Jamshoro

Many developing countries suffer from the excess population concentration in urban areas, and there occur severe environmental problems in these days. A proper urban planning for such countries is necessary to reduce the amount of CO<sub>2</sub> emission, which is main source of global warming, but these mega cities, often have no sufficient data to forecast the degree of emission. This paper attempts to estimate an inter-regional Input-Output table by using such data which is easier to obtain. This paper also proposes a method to predict CO<sub>2</sub> emission from different sectors, specially for transport sector with the help of inter-regional input-output table. In this study Karachi, [mega city] of Pakistan, as a unique example, is considered to forecast the city's performance in near future, and then examined whether there is necessity for implementation of reduction policy for CO<sub>2</sub> emission.

Key words: Reduction plan, CO<sub>2</sub> Emission, Transport sector, Inter-Regional Input-Output Table.

## Biofuels for Transport Sector in Pakistan: Potential and Prospects

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Pakistan's transport sector consumes 28% of the final commercial energy consumption and 55.8% of the petroleum products consumption in the country. About 90.4% of fuel used in this sector is oil—mainly gasoline and diesel. CNG and electricity meets the remaining 9.6% requirements. The indigenous reserves of oil and gas are limited and the country is heavily dependent on the import of oil. The oil import bill is a serious strain on the country's economy and has been deteriorating the balance of payment situation. The country has become increasingly more dependent on fossil fuels and its energy security hangs on the fragile supply of imported oil that is subject to disruptions and price volatility. The production, transportation and consumption of oil and gas also degrade the environment. Air pollution levels in Pakistan's most populated cities are among the highest in the world and climbing, causing serious health issues. Consequently, Pakistan needs to develop indigenous, environment friendly transport fuels, such as ethanol and biodiesel, to meet its transport sector's energy needs.

Pakistan is an agrarian country. Many biofuel producing crops like sugar cane, rapeseed, sunflower, jatropha etc are being grown in the country. This paper investigates the potential and prospects of biofuel alternatives for transport sector in Pakistan. The study indicates that there is substantial potential for the production and utilization of biofuels mainly ethanol from molasses and biodiesel from jatropha etc in the country. These biofuels are renewable, indigenous and environment friendly. Substitution of oil with these biofuel alternatives is essential for improving the security of energy supply and environment, and reducing the pressure on country's economy.

Keywords: Biofuels; oil; transport sector; environment friendly; Pakistan

# Poster - Abstract

## Exhaust Cleaning System for Fumes from Flame Lamination Facilities

**Josef Griessler**

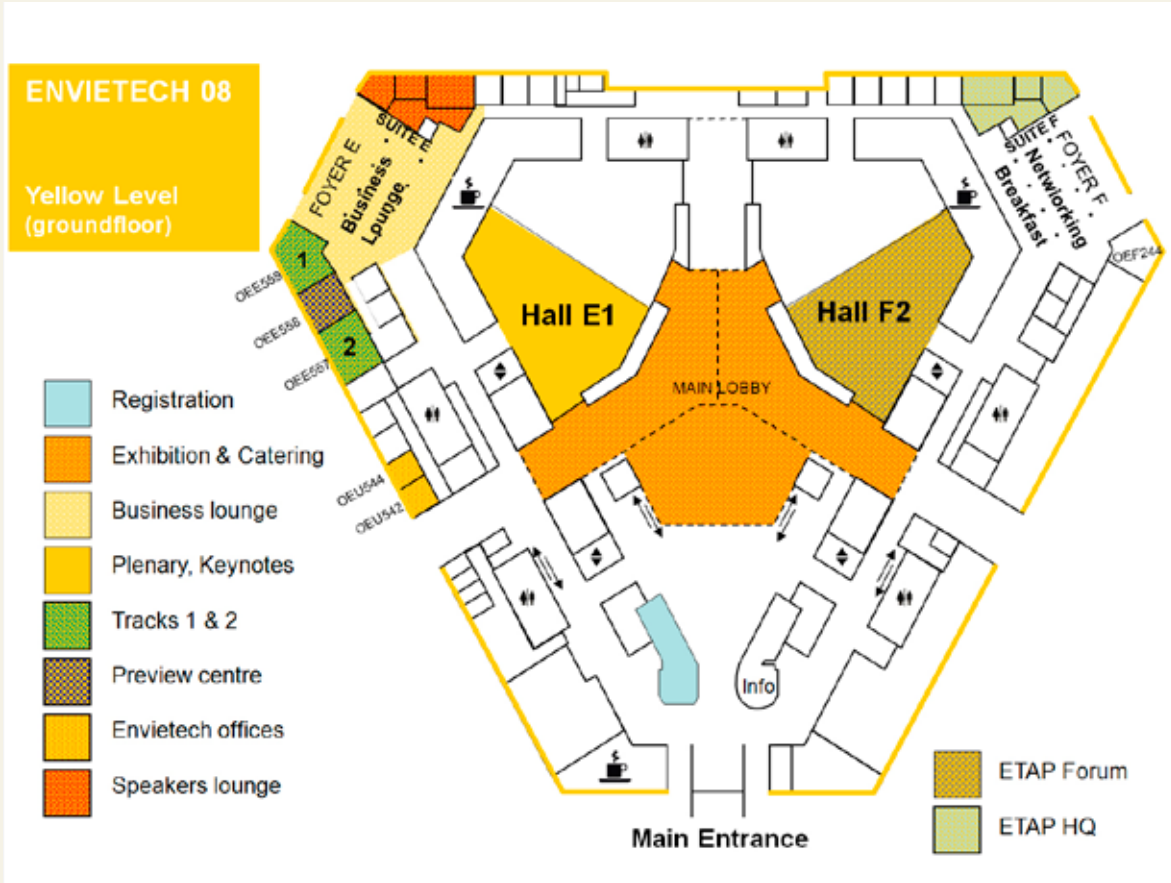
Eybl Austria GmbH  
Dr. Franz Wilhelm-Straße 2, 3500 Krems, Austria

Take in the air!

Eybl International AG, an automotive supply group in Lower Austria, is consistently banking on efficient manufacturing sites with state-of-the-art technology for production that goes easy on the environment. An excellent example of this is its exhaust cleaning system for fumes emanating from flame lamination processes. This high-tech solution with an integrated, regenerative heat recovery system eliminates the atmospheric emissions of fine particulates, VOC, and HCN. This unique solution is advancing to the position of a showcase project for BAT (Best Available Technology). In actual practice, this allows the avoidance of 10,000 kg VOC, 8,800 kg fine particulate matter, and 970 kg of HCN per year. Thus Eybl is making a positive contribution at its production site on the River Danube in Krems to preserve the „Wachau World Heritage Site“.



# Floor Plan

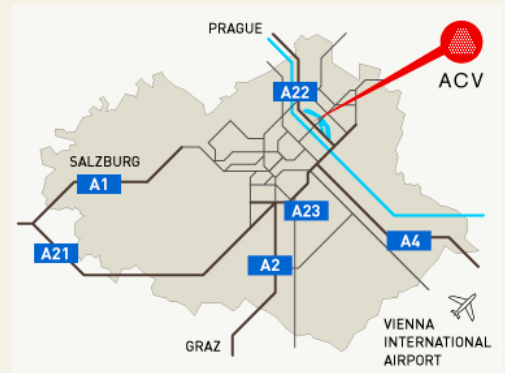


# Conference Location

## Arriving from Vienna International Airport

It takes 25 minutes to reach the ACV from Vienna International Airport via the airport motorway. There is also an airport bus which departs from the Vienna Hilton (city centre) and the Vienna International Centre (next to the ACV).

You can also take the S7 rapid transit line to Praterstern, change to the U1 underground line and exit at Vienna International Center/Kaisermühlen. Travelling time: approx. 40 mins.



## Public Transport in Vienna:

As climate neutral congress the Austria Center Vienna (ACV) can be conveniently reached by public transportation from Vienna Airport and all Vienna train stations. The closest Underground Station is "VIC-Vienna International Centre/Kaisermühlen" of U1 (red line) and take the exit „Schüttaustraße“.

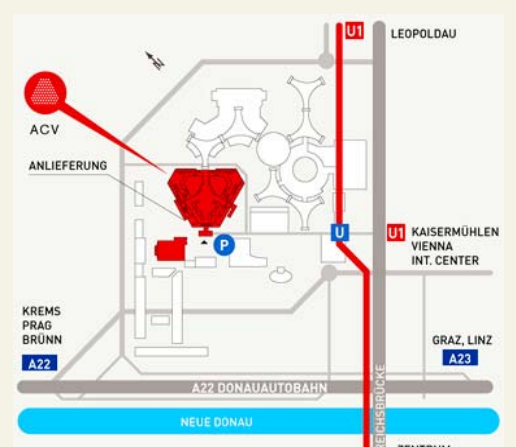


## Arriving by Train

If you are arriving in Vienna at the Südbahnhof terminus, take an S1, S2 or S15 rapid transit train and travel one station to Südtiroler Platz. There you take an U1 underground line bound for Kagran. Exit at Vienna International Centre/Kaisermühlen and take the exit marked Schüttaustrasse. Travelling time: approx. 25 minutes.

## How to get to the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

The Federal Ministry of Agriculture, Forestry, Environment and Water Management is located on Stubenring, a part of the Viennese Ringstraße in the first district of Vienna. As climate neutral congress the Ministry can be conveniently reached by public transportation in a 5 minutes walk from Underground Station „Schwedenplatz“ U1 (red line). From Schwedenplatz you can also use the tram 1 or 2 (1 station) at stop Julius-Raab-Platz.



### Address:

#### Austria Center Vienna (ACV)

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