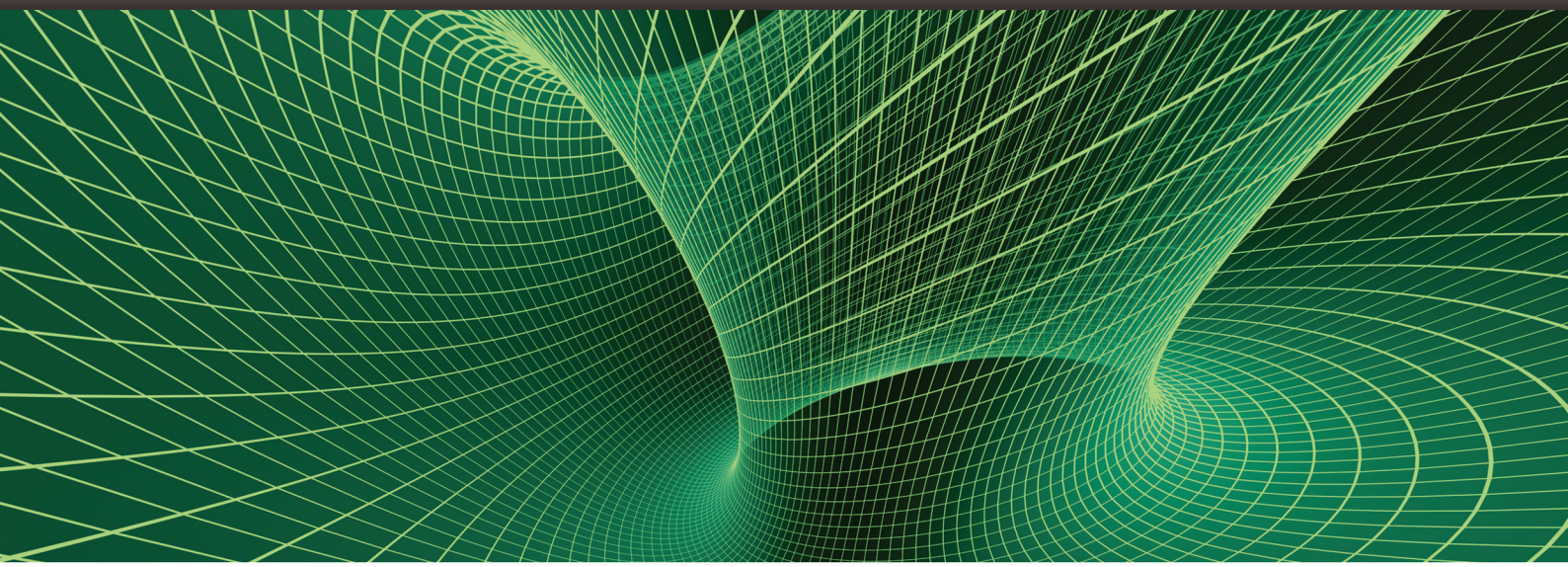

Tempus158989-Tempus-1-2009-1-BE-Tempus-JPHES

Creation of university-enterprise cooperation networks for education on sustainable technologies

Retraining and updating of PC universities staff in BE

12 – 18 September 2010.

European Commission
TEMPUS

Tempus158989-Tempus-1-2009-1-BE-Tempus-JPHES
Creation of university-enterprise cooperation networks for education on sustainable technologies

Retraining and updating of PC universities staff in BE
12th – 18th September 2010.

List of participants from WB PC

Serbia

University of Novi Sad, Faculty of technology
Novi Sad

1. Zoltan Zavargo\
2. Slobodan Sokolović

Chamber of Economy of Vojvodina
Novi Sad

3. Jovan Vujičić\
4. Nenad Petković

University of Niš, Faculty of technology
Leskovac

5. Milorad Cakić
6. Goran Nikolić

Regional Chamber of Commerce and Industry
Leskovac

7. Veroljub Gudeljević

Bosnia and Herzegovina

University of East Sarajevo

Faculty of Technology
Zvornik

8. Radoslav Grujić
9. Milorad Tomić

Chamber of Commerce Bijeljina
Bijeljina

10. Slavica Marković

Tuzla University
Faculty of Technology
Tuzla

11. Zoran Iličković
12. Elvis Ahmetović

The chamber of Economy of Tuzla Canton
Tuzla

13. Edina Kurtić

The former Yugoslav Republic of Macedonia

University Ss Cyril and Methodius

Faculty of Technology and Metallurgy
Skopje

14. Emilija Fidancevska
15. Jadranka Blazevska – Gilev

Economic Chamber of Macedonia
Skopje

16. Vasko Ristovski

University Goce Delcev
Faculty of Technology
Štip

17. Vineta Srebrenkoska
18. Sashka Golomeova

MINUTES OF THE MEETING

Sunday 12th September 2010.

Arrival of participants in Ghent

Monday 13th September 2010.

Pick up at the lobby of the hotel – public transport to KaHo Sint-Lieven
Ellen Matthijs

KaHo Sint-Lieven, Ghent, Belgium

The Meeting was attended by

Katholieke Hogeschool Sint-Lieven campus Dirk Martens
Geert De Lepeleer
Marc Van Acker
Alexis Versele
Ellen Matthijs

18 participants from WB PC

1. **Welcome by rector**
   Frank Baert
2. **Introduction**
   Geert De Lepeleer
3. **Presentation of the programme**
   Geert De Lepeleer
4. **Presentation of KaHo Sint-Lieven**
   Geert De Lepeleer
5. **Individual grantholder reports**
   Geert De Lepeleer

Lunch
KaHo Sint-Lieven (polyvalente zaal)

6. **Flemish Regulation Concerning Environmental Permits**
   case study
   Marc Van Acker

VLAREM
Flemish Regulation Concerning Environmental Permits
Two types of legislation have been discussed: VLAREM I, Permits and VLAREM II, Standards.

VLAREM I
The content of the VLAREM I is:
1. Objective
- What for is environmental permit needed?
  The classification/sections
- How can environmental licence be requisted
  The procedures.

1. Specifications
   - When an environmental permit is necessary
   - Who gives the permit
   - It determines the content of a notification
   - Where and how the environmental permit need to requested
   - Description of the progress of the procedure
   - How to make an appeal
   - The posssible alteration, addition, enclosere and refuse of the permit
2. Classes
   Based on the possible disruption(s) or negative influence(s) on the environment the negative impact on the environment is classed in three level:
   - Class 1: mostly disturbing permit
   - Class 2: conider as disturbing permit
   - Class 3: the notification class least disturbing report.
3. Legislation
   Detailed list of sections and subsections. The legislation can be applied to:

- Waste
- Waste water
- Noise and smell
- Air emissions
- Groundwater
- Etc.

At the present environmental licence valid for 5 to 20 years. There are 3 kinds of environmental conditions:

- General environmental conditions, apply to all distributing activities.
- Sectoral environmental conditions, apply to particular disturbing activities.
- Particular environmental conditions: apply to particular exploitation units or imposed by government.

CASE STUDY
Paint company De Ruiters.
The company is located in industrial area, hired from city. The activities of the company are: production of paint and glues as well as distribuution of the wall paper.
The effluent of the company are: domestic and factory effluents The Factory has it's own physical-chemical purification installation.
What is to be determine?

- Class (1, 2, 3) according to Vlarem
- Environmental coordinator (A/B/C)
- Environmental audit
- Environmental annual report
- **Investigation for soil permit**

7. Sustainable building at KaHo Sint-Lieven
Alexis Versele

The link of education, research and society related service in sustainable building was the main objective of the presentation.
At the very beginning of the presentation the education realized through bachelor and master degrees in building engineering was introduced. The research projects are:

- Electrabel fund
  (demonstration project, 2005)
- Cost effective commissioning of low energy buildings (IEA ECBCS
  ANNEX 47)
  (International research, 2005 – 2009)
- Analysis and optimization of performance criteria and calculation methods for very low energy school buildings
  (PHD, 2009 – 2013)
- Active buildings
  (Tetra, 2008-2012)
- Net Zero Energy Solar Buildings (Nzebs) (IEA SHC TASK 40 – IEA
- ECBCS ANNEX 52)
  (international research, 2009 - 2013)
- Feasibility of external air tightness of timber frame buildings
  (PHD, 2009 - 2013)

Particular attention was paid on low - energy passive cabin (with dimension 8 x 8 m, built in the form of a pyramid) which was realized in the frame of the first project "Electrabelhut". The presentation of the second project was orientated on the contribution of cost effective commissioning for existing and low energy buildings. The design and build of four very low energy testing teaching rooms in Ka-Ho was presented in the frame of the third project. The role of houses as energy producing systems with particular attention on solar energy was presented in the next two projects (3D building as a model was explained). Also, trough the presentation the group was introduced to the web sides concerning buildings consumes zero net energy.

An idea of European wide approach in low energy sustainable building was concisely presented and the impulse for dissemination in the Balkan region was activated trough discussion.

8. Tour with visit to the laboratory of environmental technology
Luc Pinoy / Philippe Demeester

In the defined activities in TEMPUS project, we visited a laboratory for deposition of metal coatings and treatment of waste water generated in the process of Kaho Sint-Lieven HOGESSCHOOL.
There are few technologies for the deposition of metal coatings:

1. Classical galvanic technology
2. galvanization of plastic
3. ''Green chemistry'' - the development of new technologies that do not produce negative influence to environment

Wastewater generated in the process of galvanization is purify in the membrane process and in the ions exchange process, where it removes most of the cations and anions of metals from wastewater. Then the water is treated electrochemically so it removes metals of very low concentrations. The complete process is monitored, the concentration of metal cations and anions in wastewater are controlled. It is also used atomic absorption spectrophotometer for determination concentration of metals that are present in "trace".

Waste water from galvanic process is especially dangerous because it may contain metal ions that are very harmful to human body, and their treatment is very important and necessary.

Beer tasting session
Jan De Cock
Barbara Jaskula

Tuesday 14th September 2010.

Pick up at the Hotel by bus
Marc Van Acker

Company visits

The Visits were attended by

Katholieke Hogeschool Sint-Lieven, Gent, Belgium
Marc Van Acker

VOKA-Chamber of Commerce East-Flanders, Dendermonde, Belgium
Katrien Moens

18 participants from WB PC

1. Volvo Cars Gent

Volvo assembles cars in Ghent, Belgium, since 1965. Here it operates an up to date facility, one of its two main assembly plants (the other being Volvo Cars Torslanda in Gothenburg, Sweden).

95 percent of all production is exported.

The major suppliers are located in the vicinity of the plant and can thus deliver the components in the right sequence and according to the just in time principles: car seats, bumpers, engines, chassis components, exhaust systems, wheels and tyres, interior components, the dashboard etcetera.

Environmental care
In line with the environmental policy of Volvo Car Corporation, Volvo Cars Gent strives for a continuous improvement in its environmental performance by taking due account of principles of prevention, technical developments, economic feasibility and commits itself to communicate this yearly to all interested parties. The company wants to be compliant with all the legal and regulatory environmental provisions that apply to its activities, products and services and assessments and audits will be performed on a regular basis to ensure this compliance.

Volvo Cars Gent wants to keep the impact on the environment as low a possible by maintaining the results already achieved and combining them with improvements in the following areas:

- environmental awareness among employees at every level;
- introduction or modification of processes and equipment;
- usage of only green energy;
- usage of natural resources;

- processing hierarchy of waste materials;
- use of hazardous substances and preparations;
- open dialogue with the community.

Wherever possible, measurable and time-bound environmental objectives will be set and the necessary measures (allocation of responsibilities and resources) will be defined in a company programme, in order to ensure that these objectives are achieved.

Volvo Cars Gent undertakes to maintain an eco-management system which meets the requirements of the Volvo Car Corporation's general management system and ISO 14001 in order to ensure that its environmental policy and corresponding environmental objectives are complied with and to facilitate management supervision of its environmental aspects.

Lunch
KaHo Sint-Lieven (polyvalente zaal)

Departure for company visit

2. Breydel, Antonio Vleeswaren bvba

POLICY OF BREYDEL FOR THE PROTECTION OF THE ENVIRONMENT
Factory Breydel Gent is a meat processing plant, primarily for production two types of products HAM and SPEK. In addition, the factory make other kind of meat products from cut meat pieces obtained during two major products production. From pieces of meat they make lunch meat and pastes.

Breydel factory has a modern facility, which has adequate infrastructure to conduct this business.

According to *Policy of Breydel for the protection of the environment* personnel analyse everything concerning the factory: all kind of installations, machines and products; description and estimation of production (quantity). In addition, they consider the following factors that impact on the environment: production of waste, waste water, possible pollution of air, soil; possible hindrance of sounds, light (spots) and odour; use of energy.

Waste products
Waste products are separately collecting: paper, plastics, fat and bones, ink cartridges and other (remains in production), than silt of fat from the well, fat from the sieve, salted water (from production process) and sludge from the waste water installation.

All of them are collected by recognised firms, registered in files and reported to the government.

In the factory is installed Cycle wastewater, **from cleaning and cooking process to purifying aerobic plant.** WASTEWATER is refined (purification) in one cycle. Steps of this cycle are: Pumping in, Denitrification (no oxygen), Aeration (nitrification + demolition organic components), Denitrification, Aeration, Release of air, Sinking, Discharge. Responsible people from factory monitor and register technical **parameters** and send report to the government. After that, people make up a **water balance** by registration the consumption and amount of discharged water.

Pollution of air
- Heating installations for the production of thermal energy and steam
- HCFK's from the cooling systems
- Cooking and smoking

Follow up the emissions and perform the required tests and maintenance of the installations.

Pollution of soil
- The storage and correctly use of dangerous products (cleaning products)
- Legal obligations implementing
- The research of possible pollution (compelled by the Law)

Possible HINDRANCE OF NOICE, LIGHT and ODOUR
Noise: ventilation systems (lower speed) and condensers; compressors (acoustic isolated technical block); traffic (system of circulation); engines of the trucks (turn off).

Light
Spots (with detection of motion)

Odour
As product of the cooking processes

Energy saving installations
Heating of the water by: sun panels (48m²) in boilers (4000 liter); recuperation of heat from the refrigeration compressors; condensing boiler (kettle)

Energy saving installations
Ventilation system witch withdraws warmth from the air (heat pump with heat exchanger) in offices; frequency controlled pumps; energy saving light; sun blends; thermostatic taps on the radiators; isolation of the builing: K level <30 (norm is 55).

Plan in future
Photovoltaic sun panels are planned to be installed (±200) for the production of electricity (±40MWh/year).

Energy management
- Control the deviation
- Registration the consumption of energy (monthly-year)
- Registration kWh production by sun panels
- Calculation of indicators
- Follow up energy market and make a deal (contract) with suppliers
- Maintenance of the system

General rules
- Follow up the legislation
- Advise and introduction of environmentally products and systems
- Control everything in practice on regularly base + make up a task system
- Good internal communication by information sessions and contact by visits on the workplace

Wednesday 15th September 2010
Public transport to KaHo Sint-Lieven

Kaho Sint-Lieven

The Meeting was attended by
Katholieke Hogeschool Sint-Lieven, Gent, Belgium
Geert De Lepeleer
Peter Lambers
Els Delaere r
Katrien Moens
Ellen Matthijs

18 participants from WB PC

1. Lifelong learning
Peter Lambers

The mission of the Service for advanced courses (SAC) are:
- To develope educations which respond to the demands of the society.
- To be a service for the departments from KaHo Sint-Lieven.
- To support developing and organising postgraduate courses, as well those from the SAC itself as those from the departments.
- To be open to cooperate with external organisations in order to develop and organise (professionaly and socialy) relevant educations.
- To join as much as possible the teaching staff and students from KaHo Sint-Lieven to enlarge by their participition the impact and feedback from these educations to the bachelor and master education.

The strategic goals of the SAC are:
- To Develop and organise a socialy relevant offer postgraduate courses.
- To Offer a programme in accordance to the bachelor and master educations from KaHo Sint-Lieven.
- To Generate knowhow for the bachelor en master educations van KaHo Sint-Lieven.
- To Develop E-learning as a tool in organising these educations and gaining expertise in blended learning.
- Searching for a common platform within the Associaton KUL to ameliorate the programmes.

The core bussines are:
- To develop postgraduate courses

- To organise postgraduate courses.
- To cooperate in programmes from KaHo Sint-Lieven (o.m. Dienst Onderwijsverzorging en -ontwikkeling, Dienst Internationalisering, Dienst Onderzoekscoördinatie, Dienst PBW en Milieu, Mediatheek).
- To Cooperate in the stiring group Postgraduate Education from the association KUL
- To Cooperate with external organisations as a partner in developing postgraduate programmes.

The main activities of the SAC are:

- Symposia (update courses)
- Postgraduate courses (< 20 credits)
- Postgraduate study programme (>20 credits)
- Continued education (60 credits)

The postgraduate study programmes in technology area:

- Prevention advisor level 1 (pgsp 40 credits)
- Energy coordinator (pgsp 20 credits)
- Environmental coordinator level A (pgsp 25 credits) and B
- Bio-ecological Building (pgsp 24 credits)
- Meat processing technology (pgsp 48 credits)

Financing

There are no financial input from the Educational department of the Flemish Government. The high financial input are from the participants (companies) e.g.:

- Prevention advisor: 4400 €
- Environmental coordinator: 3200 €
- Energy coordinator: 2100 €
- Bio-ecological building: 2400 €

More info

Website: http://extern.kahosl.be/dvo

2. Presentation of VOKA: Chamber of Commerce East Flanders

Els Delaere

Flanders: basic data

- 6 million people
- Highest concentration of ports in the world
- 175 billion euro of exports (80% Belgian exp)
- High level of education
- 19th centur: textile industry
- Now: biotech, IT, niche markets

East Flanders: some figures

- 1.389.199 inhabitants
- 463 inhabitants/km²
- BBP 25.400 €/inhabitant
- Labor productivity 62.500 €/inhabitant
- Export: 43.380 €/inhabitant

Voka

The Flemish network of companies

Voka- East Flanders' Chamber of Commerce

- Chamber of Ghent est/ in 1729.
- 2000: Chamber of Commerce East Flanders est.
- 2004: VOKA VEV
- Offices in Ghent, Oudenaarde, Aalst and Dendermonde: keeping touch with each sub region
- 3000 members (Volvo, Honda, Arcelor Mittal,…)
- 50 employees in 4 offices
- Second largest Belgian Chamber
- Accredited
- ISO certified

Voka- East Flanders' Chamber of Commerc

The structure: 6 competence centres to support companies, members of Voka

- Lobbying
- Services
- Networking

- Communication
- Training & Education and
- Internationalisation

3. How to obtain the Environmental Charter in Flanders
Katrien Moens

The conditions to receive the environmental charter are:
- To comply with the environmental legislation
- To carry out at least 4 specific environmental improvement actions, going further than the legislation

The evaluation commission grants the Environmental charter and approves the action plans.

The Commission-members are from:
- Environmental department province East-Flanders
- Environmental departments flemish authorities: environmental licences, water and air, waste and soil
- Innovation center, Flemish institute for technological investigation
- Representatives of companies: Voka , Volvo Cars

The procedure are as follows
First year participants
- Initial environmental audit
  - Compliance with legislation (to prevent "unpleasant surprises" at the end of the year). If non-conformities → corrective actions necessary
  - Suggestions for improvement actions
- Company makes action plan with at least 4 improvement actions
- Evaluation commission approves action plan
- Follow-up visit – after aprox. 6 months
  - Corrective actions
  - Improvement actions
  - Prepare evaluation audit
- Evaluation audit
  - Compliance with legislation (including corrective actions)
  - Reporting on the improvement actions
  - Plant visit
- Evaluation commission decides on granting the environmental charter

Second year participants
- **Company makes action plan with at least 4 actions after evaluation-visit previous year**
- **Evaluation commission approves action plan**
- **Follow-up report by** mail – after aprox. 6 months
  - Improvement actions
- **Evaluation audit**
  - Compliance with legislation (including corrective actions)
  - Reporting on the improvement actions
  - Plant visit
- **Evaluation commission decides on granting the environmental charter**

The tools are:
- **Checklist for environmental compliance and environmental care (with more than 250 questions)**
- **Standard evaluation report includes questions on environmental care and environmental legislation**
- **Minimal requirements for** the 10 area's.

The participants are from different sectors: Food, aautomotive, steel, education, services, textiles, transportation, hospital and port.

Thursday 16th September 2010

Pick up at the hotel by bus
An De Moor

Kaho Sint-Lieven campus Dirk Martens, Aalst, Belgium

The Meeting was attended by

Katholieke Hogeschool Sint-Lieven campus Dirk Martens

Gertjan De Smet
Emiel Van den Bossche
Peter De Coster
Patrick Matthys
Jan De Nys
Lien Verberckmoes
An De Moor

18 participants from WB PC

1. Welcome
Gertjan De Smet

2. Obtaining the Environmental Charter
Emiel Van den Bossche
During screening of the school, before participation, the following requirements had to be solved before

- Waste register
  list of waste was given with the following data:
  date, description, origin, quantity, destination, cost
- Elimination of gasoil tanks in the underground
  The oil tanks were removed.
- Asbestos inventory

The asbestos inventory was developed< code of samples, place, sort and percentage.
The following 10 subjects were proposed:

1. a coherent environmental policy & integration of environmental concerns into the company
2. a rational use of water & reduction of water pollution
3. a reduction of air pollution
4. avoidance of new & management of historic soil contamination
5. a reduction of pollution by light, noise and vibration
6. storage with regard of the environment and use of dangerous chemical products
7. the promotion of prevention, waste recovery and reduction of waste
8. the consideration of environmental aspects in purchase and investment
9. a rational use of energy
10. a reduction of the impact on the environment

3. Trainings about renewable energy:
Energy coordinator
Energy expert type A
Peter De Coster

Energy coordinator
Target

- Training for people who can help firms, organisations and private families to save energy and money on their energy cost
- An energy coordinator
  - can indicate those things which waste a lot of energy
  - can advise firms, organisations and families to decrease the energy cost

The course

- The training lasts 1 semester, 1 day/week
- The teachers are mostly professionals of the industry
- At the end of the training the student has to make a thesis
- 30 students graduate per year as “energy coordinator”

Energy expert type A

- People who graduate this course may write EPC-certificates
- They know a lot about insulation, heating and cooling a house and they can recognize the different materials

Target of the EPC (Energy Performance Certificate)

- Gives a house a number which indicates the energy consumption of the house
- It is required by the flemish government when a house is rented or when a house is sold
- It gives renters and buyers the possibility to compare the energy consumption of several houses.
- It is the goal of the government that this report can define the price of rent or sale
- It creates employment

The course

- The training lasts 8 days, spread over 4 weeks
- Participators do not need any school certificate
- There is a computer programme that calculates the number and a national database for all data
- In 2 years time almost 450 students became an "energy expert" in KaHo Sint-Lieven

4. Efficient energy use at the Campus

Peter De Coster

The campus Dirk Martens did the following energy saving investments:

- the rooftop of the main building was additionaly insulate (+18cm)
- equipment for energy consumption recording was bought
- the energy consumption were compared with consumption to similar situations
- The heat energy is produce the near the point where it is needed
- It was detected that the Ventilation is a major cause of energy loss
  In order to minimize this energy loss:
  - the amount of fresh outdoor air was tuned: the pulsed air is a mixture of 40% fresh outdoor air and 60% recycled air. In air mixing centre the percentage of fresh air is controled by a motor driven valves.
  - the energy is recovered by heat exchange between inlet and exhaust
  - the speed of funs are controlled
  - Automatic adjustement of ventilation amount by measurement of CO2 content of extracted air.
- A high efficiency boilers were installed and it was checked that condensing boilers do condensa!.
- A programmable clocks is use.

5. **Didactic construction photovoltaic solar panels**

Peter De Coster

The target of this project was to:

- To inform students, colleagues amd other people
- For exercices for students Electromechanics
- To produce electricity and save money!
- 1,000 kWh = 450 euro GSC
  (GSC = green energy certificates in 2009)
- Comparison of 5 important types
- Not: compare different producers
- Not: compare different convertors

Starting point

- Roof on top of the aula's (visible from the Science Garden)
- 5 identical convertors SMA1200
- 5 x the same power (+/- 1200 Wp)
- 5 different types:
  - Monocrystalline photovoltaic solar panels
  - Polycrystalline panels
  - Amorphous panels
  - Tube panels "sunhunter"
  - Solar mats

In Belgium a solar panel of 200 Wp produces about 170 kWh a year. A system of 10 kWp (total sun power on our campus) realizes 8.500 kWh in 1 year, which corresponds to the need of 2 families

The different photovoltaic solar panels types features

1. Monocrystalline photovoltaic solar panels
   - Generally the best production (per mm² cel)
   - More expensive than polycrystalline panels
   - Demands direct sun light
   - CDM:
   - Sharp
   - 8 panels of 180 Wp
   - Fixed with weight (concrete tiles)
2. Polycrystalline photovoltaic solar panels
   - Generally most used
   - Mostly best product (cost/profit)

- Demands direct sun light
- CDM:
- Bisol (cels made in Belgium)
- 6 panels van 230 Wp
- Fixed with weight (concrete tiles)

3. Amorphous photovoltaic solar panels
   - Generally bad result (per mm² cel)
   - Cheapest
   - Less used in Flanders, more in warm countries
   - Good function without direct light
   - Resists high temperatures
   - Less sensitive for partial shadow
   - CDM:
   - Kaneka
   - 14 panels of 105 Wp
   - Fixed with weight (concrete tiles)
4. Tube panels - Sunhunter
   - Amorphous cells
   - Reflection by the white underground “doubles” the production
   - Very light construction
   - Easy to assemble
   - Only for flat roofs
   - New product, results are questionable
   - CDM:
   - CIS sunhunter 173 Solyndra
   - 8 panels of 173 Wp
   - Without fixation!
5. Solar mats (thin film, laminate solar mats)
   - Low profit (per mm² cel)
   - cheap
   - Very light
   - “Easy” assembly
   - Pay attention! It is not sealing
   - Only for flat roofs
   - Nearly invisible
   - CDM:
   - Solar
   - 10 strokes of 144 Wp
   - Fixing with the right glue
6. Tracker
   - Follows the sun light
   - Expensive to install
   - Permission of the city is required
   - With polycrystalline solar panels
   - Moves a lot
   - Great result
   - CDM:
   - Solar
   - 3300 Wp

Future

- **Didactic panel in the science garden**
- **Scale model with small panels like the great one**
- **Datalogging with a Beckhoff PLC and put the numbers on the internet?**
- **Next projects:**
  Measuring the wind velocity on the campus – feasibility of a wind turbine (the results aren’t very good at the moment)
  Covering the whole roof of the main building with photovoltaic solar panels 50 - 150 kWp

6. **Design, Build and Operation of a Passive House for the Purpose of Environmental Education and Nature Observation**
Lien Verberckmoes

Aimed purposes
The aim of this Project was to spread the knowledge of sustainable building to the own, students, teachers and pupils. To be in service training for different groups, open to the audience to disseminate of results of our research groups, integrating different techniques (soft and hard) in a edicational center and coöperation between diffenerent groups of students.

Project definition
The goal was to build and start a small documentation and educational centre realized with the passive house standard and with ecological and renewable materials.

Three certificate criteria for a passive house are:
- **the net energy demand for heating ≤ 15 kWh/m² year**
- **air-tightness n50 ≤ 0,6 h-1 (tested by the blowerdoor test)**
- **temperature exceeding** frequency above 25°C ≤ 5%

After the presentaion the Passive cabine was shown to the participants.

7. Waste water treatment
Company visit AQUAFIN
In the wastewater treatment plant AQUAFIN wastewater from the houses is transported and treated in this plant. Treated water is discharged to recipient. By-product from wastewater treatment plant is sludge which is reused, recovered or incinerated with energy recovery. Biogas produced by sludge digestion is used to produce green power. IVAGO represents inter-communal co-operation for waste management in Gent and Destelbergen. The main activities of IVAGO are collection of household waste, cleansing services city of Gent, marketing of collected waste fractions, waste communication and education programs, refuse waste incineration with energy recovery. Sustainable waste management of IVAGO follows waste hierarchy including prevention, reuse, recycling, incineration with energy recovery and no landfill disposal of untreated waste. The gained experience in retraining program on sustainable industry will help us to create and develop new curricula for the staff from the industry of RS, BA and MK.

Dinner
Restaurant Yanko

Friday 17th September 2010.
Pick up at the Hotel
Marc Van Acker

Company visit
IVAGO

The Visits were attended by
Katholieke Hogeschool Sint-Lieven, Gent, Belgium
Marc Van Acker

18 participants from WB PC

Visit to the IVAGO company in Ghent was realized on Friday 17/Sep/2010, from 10 to 12 hours, according to programme. The presentation was made by the company's general manager, Mr Paul Dobbelaere.

IVAGO (Inter-municipal Association for Waste Management in Ghent and surroundings) is an intermunicipal utility company in charge of waste management for the city of Ghent and its surrounding communities. The company was founded in 1994. and began operations in 1995. The company has certified ISO 14001 and 9001. The number of employees in the company is 400. The ownership structure of this company is as follows: Public partners 49,9% (Ghent and Destelbergen); Private partner 49,9% ECOV (INDAVER and SITA); Associated partners (incineration): IVLA 0,001% and IDM 0,001%.

Objective of IVAGO is sustainable waste management. IVAGO is active in four areas:
collection of household waste from private residences,
collection of similar waste from companies (SMEs, hotels and restaurants),

public cleaning and sanitation services for the City of Ghent,

incineration of household and similar waste in an incineration plant, including fume purification (deNOx i CO2) and energy recuperation.

IVAGO has equipped his incinerator with an energy recovery system to maximize the conversion of the energy in the flue gases into steam. This steam is used both for production of electricity as for heat supply to UZ (university hospital). IVAGO also wanted a full independence of the electrical network. Therefore plant was designed to operate in "island". Also the start of the lines was made possible in a island and a diesel group has been placed.

Long term strategy of IVAGO is control of costs of waste, through stages such as: waste prevention, recycling and reuse, information about waste streams, change of behaviour towards waste and feedback of results.

IVAGO in its structure has a center for the selection of waste being sent for recycling: demolition waste, green waste, metals, white goods & brown goods, wood, tyres, household hazardous waste (batteries, paint residues, oils), textile, etc. The stages of recycling and reuse include: a) Selective door-to-door collection (glass, paper, kitchen and garden waste, bulky household, packaging waste such as plastic bottles, metal and drink cans, etc.); b) Selective collection appartment blocs; c) Application principle "the polluter pays".

Saturday 18th September 2010.

Departure