

SARDINIA 2011

Thirteenth International Waste Management and Landfill Symposium

3-7 October 2011

S. Margherita di Pula (Cagliari), Sardinia, Italy

Organised by :

IWWG - International Waste Working Group

With the scientific support of

University of Padua (IT)

Tongji University (CN)

Technical University of Denmark (DK)

Fukuoka University (JP)

University of Central Florida (US)

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With the support of:

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Regional Government of Lombardia - Department for the Territory and Town Planning (IT)

Regional Government of Sardinia - Department for Environmental Protection (IT)

Regional Government of Veneto - Environmental Policy Department (IT)

Promoted by :

ADEME - Agence de l'Environnement et de la Maitrise de l'Energie, France

AMADES - Moroccan Association of Solid Waste

ATEGRUS - Technical Association for the Waste Management and the Environment, Spain

CIWM - Chartered Institution of Wastes Management, UK

Danish Environmental Protection Agency

DEFRA - Department for Environmental Food and Rural Affairs, UK

IGS - International Geosynthetics Society

IWMSA - Institute of Waste Management South Africa

LSA, NPO - The Landfill Systems & Technology Research Association of Japan

WMAA - Waste Management Association of Australia

PRESENTATION

Waste management strategies and technologies are currently undergoing rapid development. The Sardinia Symposia were established in 1987 in order to make knowledge and experiences in this field readily available. The Symposia have become the Reference Forum, where leading experts meet and present their research activities and experiences and discuss new concepts and technologies. The Symposia have witnessed and contributed worldwide to the development of modern waste management strategies such as the integrated waste management hierarchy, recovery of energy and sustainable landfilling.

The twelfth Symposium was held in October 2009 in the traditional venue of the Forte Village Complex in S.Margherita di Pula (Cagliari), with an attendance of approximately 1000 delegates from 80 different countries.

The Symposium focuses on innovative aspects of Sustainable Waste Management, presenting new technologies, describing the state of the art and related case studies, discussing controversial subjects, sharing experiences among different countries and evaluating social and economical balances.

The Symposium includes oral presentations, poster sessions, specialized sessions and specific workshops.

In accordance with a consolidated tradition, the Symposium will be opened by an introductory lecture not strictly linked to sanitary landfilling. The thirteenth edition will be opened by Prof. Armin Reller with a lecture on "Waste and Electronics".

THE SYMPOSIUM STRUCTURE

The Symposium is structured in two General Sessions (A and B), three Specialized Sessions (C, D and E) and two Workshop Sessions (F and G) for a total of seven parallel tracks. Additionally, this year for the second time running, an eighth session will be held entirely in Italian to facilitate participation by local experts and administrators.

General Sessions A and B are usually attended by a considerable number of delegates and contributions within these sessions (20 minutes) are presented following a strict schedule, in order to enable delegates to plan participations adequately. Twenty minutes are devoted to discussion. Topics discussed during Sessions A and B will be examined in greater detail during Specialized Parallel Sessions and Workshop Sessions.

In Specialized Sessions shorter lectures (15 minutes each) are scheduled. Sessions F and G are dedicated to Workshops and are primarily addressed to experts on the specific topics.

Introductory presentations are included in order to open discussion on more controversial aspects.

TRAINING COURSES

Four training courses will be arranged by IWWG (International Waste Working Group) on Sunday October 2nd prior to opening of the Symposium, covering the following themes: composting, landfill gas management, design criteria for innovative landfills and treatment of landfill leachate.

Courses are open to all participants and are suited to beginners. Certification of completion will be distributed on request at the end of the classes.

The registration fee for courses is 60 Euros each (45 Euros for IWWG members).

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Conference venue and location

Sardinia 2011 will be held in the Forte Village Resort situated near S. Margherita di Pula, on a long sandy bay on the southeastern coast of Sardinia. The Hotel complex, about 40 km from Cagliari (the capital of the island) and 8 Km from S. Margherita di Pula, is set in a natural park of 25 ha.

Forte Village Resort

09010 S. Margherita di Pula (Cagliari)
Tel. +39 070 92171 - Fax +39 070 921246

Continuously updated information is available on the Official Symposium website: <http://www.sardiniasymposium.it>

For further information please contact the email address:
info@sardiniasymposium.it



DAILY PROGRAMME

8.30 - 13.00 Registration for Training Courses

IWWG Training Courses

09.00 - 13.00

T1: Composting

Chair: E. Binner (BOKU University, Vienna, AT)

- Feedstock
- Biology of the (aerobic) rotting process
- Optimising of rotting conditions
- Quality of compost
- Application of compost

11.00 - 13.00

T2: Landfill gas management

Chair: M. Ritzkowski (Hamburg University of Technology, DE)

- Biogas production model
- Extraction and transportation
- Problems and risks
- Poor gas treatment
- Energy recovery

14.30 - 16.30

T3: Design criteria for innovative landfills and a comparison with the conventional approach

Chairs: M. Huber-Humer (BOKU University, Vienna, AT) & R. Pomi (University of Rome "La Sapienza", IT)

- Introduction to the innovative landfill concept
- Waste pre-treatment as a barrier to contaminants emission
- Design and construction of:
 - bottom liner and leachate collection
 - biogas collection system
 - traditional and innovative top cover

16.45 - 19.00

T4: Treatment of landfill leachates for discharge to watercourses

Chair: H. Robinson (Enviros Consulting, GB)

- Generation and composition of landfill leachates
- Treatment processes
- Case studies

16.00 - 19.00 Conference Registration

Monday October 3rd - Morning

8.30 - 13.00 Delegate Registration

OPENING SESSION - *Central Hall*

Chairman: R. Cossu (IT)

9.00 - 10.00 Welcome Addresses

Opening Lecture

10.00 - 10.50

A. Reller (DE)

Waste and Electronics

10.50 - 11.20 Coffee Break

Introductory presentations:

What to learn from the past for the future of waste management

11.20 - 11.40

W. Bidlingmaier (DE)

Evolution of biological treatment of waste

11.40 - 12.00

B. Bilitewski (DE)

Advances in waste to energy technologies

12.00 - 12.20

P. Lechner, M. Huber-Humer (AT)

The road to sustainable landfilling

12.20 - 13.00 Discussion

SESSION A1 - *Central Hall*

National strategies in waste management

15.30 - 15.50

P. Flyhammar (SE)

One decade of dramatic changes of the Swedish management of household waste

15.50 - 16.10

D. Gamble, A. Montgomery (AU)

Challenges and successes in implementing alternative waste technologies in Australia

16.10 - 16.30

H. Moora, R. Uselytė (EE)

Development of municipal solid waste management systems in Estonia and Lithuania: a comparative analysis

16.30 - 16.50

T. Dorn, M. Nelles, S. Flamme, J. Cai (DE)

Technology transfer in MSW disposal to reduce the carbon footprint of China

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION A2 - *Central Hall*

Waste prevention

18.00 - 18.20

A. Bartl (AT)

Zero waste: a desirable goal or empty words?

18.20 - 18.40

A.E. Santamaria, F.G.A. Vagliasindi (IT)

Development of a set of indicators for monitoring implementation of measures to prevent MSW production

18.40 - 19.00

S. Scherhauser, F. Schneider (AT)

Prevention, recycling and disposal of waste bread in Austria

19.00 - 19.20

T.H. Christensen, E.C. Gentil (DK)

Environmental benefits of waste prevention: food, packaging and advertisement

19.20 - 19.40 Discussion

SESSION B1 - *Panorama Hall*

Assessment and decision tools in landfilling

15.30 - 15.50

H. Corvellec, T. Bramryd, J. Hultman (SE)

The multiple market-exposure of Swedish municipally owned waste management companies

15.50 - 16.10

H.A. Van Der Sloot, D.S. Kosson, O. Hjelmar, R.N.J. Comans (NL)

Recent developments in testing, modelling and environmental impact assessment applicable to landfilled waste, treated waste and waste considered for beneficial use

16.10 - 16.30

E. Suchomel, M. Verwiel, G. Thrupp (US)

A new method for calculating waste acceptance criteria for soil at landfills

16.30 - 16.50

T. Parker, P. Pointer, A. Childs, J. Lockhart (GB)

Cost benefit analysis to identify the most sustainable management option for landfills

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION B2 - *Panorama Hall*

Sustainable landfilling

18.00 - 18.20

R. Stegmann, K.-U. Heyer, K. Hupe (DE)

Do we have to take care of landfills forever?

18.20 - 18.40

O. Hjelmar, J.B. Hansen, M. Mohr, J. Nedenskov, C. Scheutz, S. Stentsoe (DK)

Sustainable landfilling: some conceptual and practical issues

18.40 - 19.00

J. W.F. Morris, M. Crest, A. Åkerman, M.A. Barlaz, K. A. Spokas, L. Yuan, D. Presse, S. Hayward-Higham (FR)

Improved methodology to assess modification and completion of landfill gas management in the aftercare period

19.00 - 19.20

R. Sjöblom, S. Lindskog, L. Andreas (SE)

Lessons learned from nuclear decommissioning and waste management relevant to end of responsibility for landfills

19.20 - 19.40 Discussion

SESSION C1

15.30 - 17.10

Waste characterization

C. Dumas, V. Prabhudessai, S. Mutnuri, J.-P. Steyer, M. Torrijos (FR)
Characterization of food solid wastes for predicting methane potential and degradability

N. Menad, J. Van Houwelingen (FR)
New characterisation method of Wastes of Electrical and Electronic Equipment (WEEE)

Y. Hirai, S. Sakai, Y. Matsuda (JP)
Biomass fraction of municipal solid waste determined by ¹⁴C method

S. Flamme, J. Geiping (DE)
Quality assurance and standardization of solid recovered fuels

R. Cossu, T. Lai, L. Salin, A. Sandon (IT)
Standardization of BOD₅/COD ratio as a biological stability index for MSW

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION C2

18.00 - 19.40

Waste management in developing countries (I)

B. Callaert, R. Hentati (BE)
Sustainable development in the City of Sfax (Tunisia) - Taparura project

I. Jahan, M. Alamgir, B. Khadiza, M.A.K. Salim (BD)
Siting and design of transfer station in Khulna City of Bangladesh

E. Nehrenheim, P. Klintenberg, M. Odlare (SE)
Recirculation of biogas residue to agricultural land in Namibia - risks and potentials in full utilization of organic waste

V. Schalch, R.E. Cordoba (BR)
Study of the integrated management of construction and demolition wastes from Sao Carlos - SP

O.E. Taiwo, F.A.O. Otiemo (ZA)
Comparative study of solid waste management practises for selected cities in Africa

E.A.G. Marques, L.C.R Andrade, A.A.P. Buselli, I.C.D Azevedo, R. Azevedo, F.P. Fonseca, T.C De Souza, I.A. Barbosa (BR)
Evolution of MSW disposal in Zona da Mata, Minas Gerais State, Brazil

SESSION D1

15.30 - 17.10

Landfill settlement

J.R. McDougall (GB)

Landfill models: classifying parameter demands

A. Mifsud, Q. Napoleoni (MT)

Settlement measurement and analysis in Malta's landfill

M. Conte, P. Carrubba (IT)

Mechanical and biological aspects in MSW settlements

G.F. Simões, C.A.A. Catapreta (BR)

Settlement monitoring of an experimental landfill, Belo Horizonte Brazil

R.L. Thomas, S.D. Cooke (GB)

Numerical prediction of landfill post-capping waste settlement: the analytical process, calibration and remedial works implementation

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION D2

18.00 - 19.40

Hydro-mechanical issues in landfilling

N.D. Woodman, R.P. Beaven (GB)

Assessment of simple preferential flow concepts for transport through municipal solid waste

L. Yu, F. Batlle, J. Carrera, E. Vázquez-Suñé, J. Font (BE)

Numerical analyses of a leachate pumping test at a MSW landfill

M.C. Di Lonardo, F. Lombardi, S. Pantini, I. Verginelli, P. Sirini, F. Ermolli (IT)

Modeling the water-balance of sanitary landfills: a case study

I. Fleming, M.A. Fleming, J.S. Sharma (CA)

Cyclic loading of waste for design of a wind turbine foundation on a landfill

N. Drut, J.P. Gourc, M. Staub, G. Stoltz, A. Mansour (FR)

Large-scale oedometers (CICLADES) for monitoring the long-term hydro-mechanics of MSW

N. Shariatmadari, M. Karimpour-Fard, M. Keramati, H. Jafari Kolarijani, A. Naebi (IR)

Fiber content impact on the shear strength of MSW materials in direct shear tests

SESSION E1

15.30-17.10

Anaerobic co-digestion

T. Takahashi, N. Osaka, H. Hosono, T. Fujiwara (JP)

A demonstration of a biomass energy system by dry anaerobic digestion for urban areas in Japan

E. Marañón, L. Castrillón, G. Quiroga, Y. Fernández-Nava, L. Gómez, M.M. García (ES)

Co-digestion of cattle manure with food waste and sludge to increase biogas production

C. Ratanatamskul, O. Wattanayommanaporn, K. Yamamoto (TH)

Co-digestion of food waste and sewage sludge by two-stage anaerobic digester for biogas production from high-reuse building

M. Rouez, M. Lemunier, Y. Lessard, A. Simao, L. Galtier (FR)

Co-digestion of diapers organic fraction: feasibility study

P.K. Prapatchandran, V. Gandhiraj (IN)

Co-digestion of thermally pretreated municipal solid wastes (MSW) with distillery effluent

A. Białowiec, M. Templin (PL)

The influence of modification of municipal solid waste organic fraction on biogas production

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION E2

18.00-19.40

Construction & demolition waste (I)

Y. Menard, K. Bru, S. Touze, A. Lemoign, J.E. Poirier, G. Ruffie, F. Bonnaudin, F. Von Der Weid (FR)

Innovative process routes for a high-quality concrete recycling in the aggregates and cement industries

H.J. Kim, K. Endo, Q. Tang, M. Yamada (JP)

A comparison of leaching behaviors of construction and demolition waste residues from the intermediate scale lysimeters with different length/width ratios

S. Butera, J. Møller, T.H. Christensen (DK)

LCA of recycling options for gypsum from construction and demolition waste

A. Pertl, G. Obersteiner, S. Scherfhauer (AT)

Environmental assessment of waste prevention and reuse measures in the construction sector

SESSION F1

15.30-17.10

Workshop:

Hydrothermal carbonization of waste

Introductory lectures:

N. Berge (US)

Hydrothermal carbonization of municipal solid waste: comparison to current management techniques and associated environmental implications

S. Stengl, C. Koch, E.A. Stadlbauer, B. Weber, K. Albert, M. Bayer (DE)

Production of carbonaceous materials from low value biomass by hydrothermal carbonization and low temperature conversion: a comparison of techniques

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION F2

18.00-19.40

Workshop:

Carbonation of special waste

Introductory lectures:

R. Baciocchi, G. Costa, A. Poletti, R. Pomi (IT)

Leaching behaviour of steel slag treated by accelerated carbonation

L. Sarperi, M. Pellerano, A. Subrenat, A. Kerihuel, F. Chazarenc (FR)

The use of an industrial by-product as a sorbent to remove CO₂ and H₂S from biogas



SESSION G1

15.30-17.10

IWWG Workshop:
CLEAR Task group

Introductory lecture:

M. Huber-Humer (AT)

Performance of methane oxidation systems - the need of proper evaluation criteria

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION G2

18.00-19.40

IWWG Workshop:
CLEAR Task group

In session G2 the debate started in the previous Session G1 will be continued.



SESSIONE I1 (*in Italiano*)

15.30-17.10

Recupero e riqualificazione ambientale delle discariche

A. Artuso, E. Cossu (IT)

Bonifica e riqualificazione delle discariche: criteri ed esempi

R. Raga, R. Repetti (IT)

Fattibilità e prospettive per il Landfill Mining in Italia

S. Querci, G. Delbarba (IT)

Il recupero ambientale di una discarica. Restituire territorio al territorio. Trenzano, Castrezzato (Brescia, Italia)

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSIONE I2 (*in Italiano*)

15.30-17.10

Recupero ambientale di siti contaminati (aree dismesse)

S. Demuru, R. Dessì, A. Murgia, S. Pilurzu (IT)

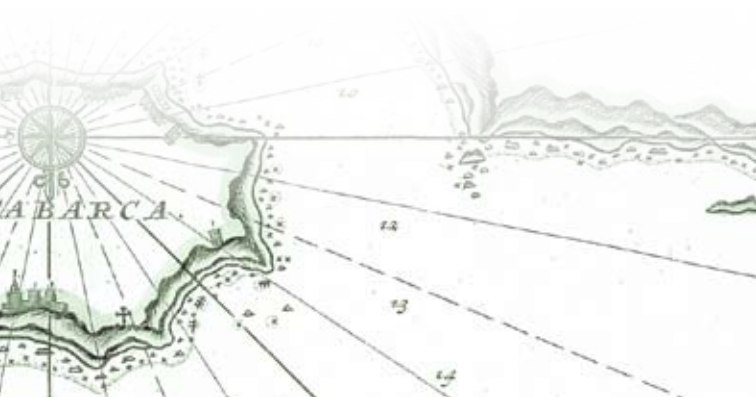
Linee guida per la caratterizzazione e la bonifica delle aree minerarie dismesse

A. Angeloni, A. Bavestrelli, M. Maroni, N. Cogoni (IT)

Bonifica e recupero ambientale dell'area mineraria di Baccu Locci nei territori dei comuni di Villaputzu e San Vito - Provincia di Cagliari

D. Caniani, D.S. Lioi, I.M. Mancini, S. Masi (IT)

Valutazione del rischio di contaminazione dei suoli con reti neurali



SESSION A3 - *Central Hall*

Waste collection systems

09.00 - 09.20

A. Bernstad, J. La Cour Jansen (SE)

Collection of household food waste - Comparison of different techniques from a systems perspective

09.20 - 09.40

S. Sheward, I.D. Williams (GB)

The impact of alternative weekly collections on waste arisings: an English case study

09.40 - 10.00

R.G. Souza, M.P.E. Lins, R.A.B. Valle (BR)

Assessing the efficiency of solid waste collection services in Brazil

10.00 - 10.20

M. Ragazzi, E. Girelli, E.C. Rada (IT)

A proposal for selective collection guidelines for institutional buildings

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION A4 - *Central Hall*

Life cycle approaches in waste management

11.10 - 11.30

S. Manfredi, R. Pant, D. Pennington (IT)

Supporting environmentally sound decision-making for European waste management with a life cycle thinking approach

11.30 - 11.50

J. Clavreul, T.H. Christensen (DK)

Uncertainties in life cycle assessment of waste management systems

11.50 - 12.10

A. Haddad, D.R. Reinhart, M. Chopra (US)

Comparative life cycle assessment of different waste management options for green waste

12.10 - 12.30

J. Yano, Y. Hirai, S. Sakai (JP)

Life cycle analysis of waste management focused on waste categories and treatment methods

12.30 - 12.50 Discussion

SESSION B3 - *Panorama Hall*

Flushing and recirculation in landfills

09.00 - 09.20

T. Rees-White, R. Beaven, H. Woelders, T. Beaumont, M. Hannen, A. Marsen (GB)

Preliminary results of a fill and draw flushing test in pilot-scale landfill cell

09.20 - 09.40

S. Reyes, W. Powrie, M. Darqui (AR)

Minimum leachate recirculation rates for aerobic and anaerobic degradation in pilot scale waste landfill cells

09.40 - 10.00

A.P. Hudson, R.P. Beaven, J.A. Barker, N.D. Woodman, K. Knox (GB)

An experiment to investigate various methods of flushing contaminants from MSW

10.00 - 10.20

W. J. Van Vossen, H. Peperkamp, D.T. Folmer (NL)

Progress of sustainable landfill stabilization after 3 years of recirculation of leachate at the Vlagheide landfill in Schijndel (NL)

10.20 - 10.40

Discussion

10.40 - 11.10

Coffee Break

SESSION B4 - *Panorama Hall*

Landfill gas generation

11.10 - 11.30

R.G. Gregory, D.M. Browell (GB)

Recent developments in understanding of waste degradation rates and modelling landfill gas generation and recovery

11.30 - 11.50

K. Knox, K.Cheng, S. Hayward-Higham (GB)

Uncertainties in understanding and measuring the completion of waste degradation

11.50 - 12.10

J. Lamborn (AU)

Issues in using medium to large scale landfill data for modelling, model calibration and prediction

12.10 - 12.30

J. Gebert, N. Hanke, S. Bohn, E. Smidt, J. Streese-Kleeberg (DE)

Gas potential of old landfills

12.30 - 12.50

Discussion

SESSION D3

09.00-10.40

Renewable energy from landfills

M. Kuehle-Weidemeier (DE)

Development, construction and operation of a flexible landfill cover with an integrated photovoltaic power plant

W.H. Stachowitz, F. Ender (DE)

Energy supply of a landfill site in the after care period by LFG, sun, oil, natural gas etc.

R. Meoni, I. Pecorini (IT)

An aftercare and monitoring plan of a MSW landfill: a way to use unusable space

M.C. Lavagnolo, R. Cossu, M. Malagoli, L. Alibardi (IT)

Energy Crops Cover in landfills

10.40 - 11.10 Coffee Break

SESSION D4

11.10-12.50

Characterization of landfill leachate

*M. Van Praagh, N. Torneman, M. Johansson, L. Ingelsted Fren-
dberg, E. Heander, A. Johansson (SE)*

Emerging organic contaminants in leachates - Review and risk assessment

J. Zagorc Končan, G. Kalčíková, A. Žgajnar Gotvajn (SI)

Comprehensive evaluation of local municipal landfill leachate quality - A useful tool for appropriate treatment management

K. Haarstad, T. Møhlum (NO)

Modern Norwegian leachate (2005-2010) compared to older (1998-2002)

A. Białowiec, M. Kopik (PL)

Fractal geometry: a tool for phytotoxicity assesment of landfill leachate on willow



SESSION E3

09.00- 10.40

CDM approaches in waste management

M. Siebel, A. Nabende, J. Gupta, V.S. Rotter (NL)

Clean Development Mechanism - Mitigating GHGs and improving sustainable development?

M. Bereznytska, Y. Pyrozhenko (UA)

Joint implementation program of activity: agricultural waste utilization for generating of electricity and heat at the farms of Ukraine

M. Gallo, A. Del Borghi, M. Del Borghi (IT)

Application of clean development mechanism to animal waste management system (AWMS): a methane recovery project in Serbia as case study

C.J. Liebenberg (ZA)

Carbon emission benefits arising from reclaiming of recyclables by informal waste pickers

C. Trois, R. Couth (ZA)

Reduce carbon emissions from improved waste management in Africa

10.40 - 11.10

Coffee Break

SESSION E4

11.10-12.50

WEEE recovery & recycling

N. Menad, J. Van Houwelingen (FR)

Identification and recovery of rare metals in electric and electronic scrap

H. Friege (DE)

Limits of resource recovery and waste management with regard to electric and electronic equipment

L. Wen, C. Lin, T. Chang (TW)

The comparison study of the extended producer responsibility systems for WEEE recycling in two Chinese societies: Taiwan and China

V.S. Rotter, A. Janz, M.A. Siebel, B. Bilitewski (DE)

Effect of the removal of hazardous substances from WEEE on emission of treatment and recycling

S. Salhofer (AT)

Efficiency of take back system for waste electrical and electronic equipment in Europe

SESSION F3

09.00-10.40

Workshop:

Nanowaste issues

Introductory lectures:

S.C. Bolyard, D. Reinhart, S. Santra, S. Basumallick (US)

Fate of coated zinc oxide nanoparticles in municipal solid waste landfills

A. Boldrin, S.F. Hansen, A. Baun, N.I.B. Hartmann, T. Astrup (DK)

Nanowaste: business-as-usual or a new challenge for the waste industry?

P. Lozano, N.D. Berge (US)

Carbon nanotube behaviour in representative old leachate

10.40 - 11.10

Coffee Break

SESSION F4

11.10-12.50

Workshop:

Bio-filters for landfill methane mitigation

Introductory lectures:

F. Straka (CZ)

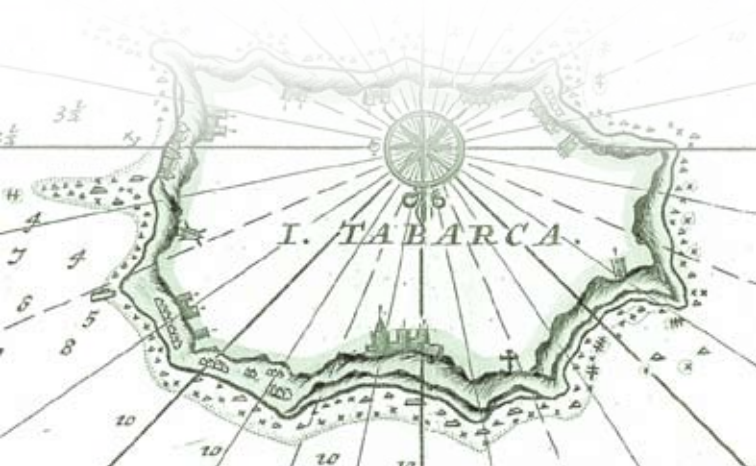
LFG-biofilters: critical evaluation of gas mitigation effectivity after 20 years of operational experiences

S. Dever, X. Wang, G. Swarbrick, R. Stuetz (AU)

Longer term performance of a passive landfill gas biofiltration system in Australia

M. Pawłowska, W. Stępniewski (PL)

Enhancement of methane oxidation capacity in biofilter due to aeration - a laboratory study



SESSION G3

09.00-10.40

Workshop:

Evaluation of biodegradable waste sent to landfill

Introductory lecture:

R. Campbell, J. Moriarty, J. Derham, O. Gaillot (IE)

Ireland's approach to measuring the diversion of biodegradable municipal waste from landfill

10.40 - 11.10 Coffee Break

SESSION G4

11.10-12.50

Workshop:

Landfill design & construction

Introductory lectures:

R. Cossu (IT)

Innovative issues in landfill design & construction

K.A. Zamara, N. Dixon, D.R.V. Jones (GB)

Design of drainage systems in geosynthetic landfill caps

O. Del Greco, P. Lefevre, C. Oggeri (IT)

Performances of draining geosynthetics for applications in landfill construction

R. Cossu, P. Carrubba, M. Conte, V. Salieri, R. Raga (IT)

When wrong design is the main problem in landfilling - A case study



SESSIONE I3 (*in Italiano*)

09.00-10.40

Controllo degli odori negli impianti di compostaggio

E. Ranieri, A. Di Biase, V. Torretta, G. Urbini (IT)

L'impianto di biostabilizzazione di Bari. Correlazione tra composizione dell'effluente del biofiltro ed unità odorigene

A. Mantovani, A. Pittarello, M. Benzo, L. Palmeri, L. Ranzato (IT)

Valutazione dell'impatto odorigeno di un impianto di digestione anaerobica: confronto tra una tecnica sensoriale (odour field inspection) e un modello di dispersione in atmosfera (CALPUFF)

10.40 - 11.10

Coffee Break

SESSIONE I4 (*in Italiano*)

11.10-12.50

Rifiuti speciali

G. Valentini, L. Ammannati, F. Braca, A. Cecchi, M. Franceschi (IT)

Criteri metodologici per la valutazione dell'efficienza del processo di stabilizzazione dei rifiuti

R. Lacroce, D. Napoli, G. Morgantini (IT)

Strategie innovative di smaltimento dei rifiuti sanitari pericolosi a rischio infettivo

C. Fucas, G. Balletto (IT)

Gestione rifiuti da demolizione e costruzione per una ricostruzione sostenibile a seguito di eventi catastrofici

F. Peres (IT)

La gestione dei fanghi di dragaggio nell'implementazione italiana della direttiva 2008/98/CE

F. Paglietti, V. Di Molfetta, S. Malinconico, S. Bellagamba (IT)

Il problema delle discariche e dei centri di stoccaggio di amianto in Italia



SESSION A5 - *Central Hall*

Management of automotive shredder residues

15.30 - 15.50

N. Ahmed, H. Wenzel, J.B. Hansen (DK)

Feasibility of resources recovery from shredder waste

15.50 - 16.10

O. Hjelmar, J.B. Hansen, J.K. Jensen, J. Nedenskov, H. Rolsted, M. Therkildsen, M. Sørensen, J. Nejrup, O.V. Christiansen, M.T. Andersson (DK)

Landfilling of shredder residues: lysimeter leaching tests and field tests

16.10 - 16.30

J.B. Hansen, O. Hjelmar, J. Hyks, H. Rolsted, M. Therkildsen, J. Nedenskov, F. Andersen (DK)

Landfilling of shredder residues: testing of leaching properties

16.30 - 16.50

L. Bellini, F. Caminiti, G.L. Soldi (IT)

Automotive shredder residue mono-landfill: design, management and monitoring

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION A6 - *Central Hall*

Recycling of selected WEEE

18.00 - 18.20

G. Dodbiba, H. Nagai, L.P. Wang, T. Fujita (JP)

Comparing mechanical crushing with high-voltage desintegration for designing an effective system to recover indium from obsolete LCDs

18.20 - 18.40

C. Lin, K. Fan, L. Wen (TW)

Optimized solutions for recycling waste liquid crystal display (LCD) products

18.40 - 19.00

F.O. Ongondo, I.D. Williams (GB)

What's your phone worth? Estimating the resource value of stockpiled mobile phones

19.00 - 19.20

F.O. Ongondo, I.D. Williams, J. Dietrich, C. Carroll (GB)

Towards reuse networks for ICT: experiences from the zerowin project

19.20 - 19.40 Discussion

SESSION B5 - *Panorama Hall*

Landfill gas collection

15.30 - 15.50

H.R. Amini, D.R. Reinhart (US)

Evaluating landfill gas collection efficiency uncertainty

15.50 - 16.10

W.H. Stachowitz, F. Ender, R. Hiemstra (DE)

Optimization of gas collection systems landfills, hazardous waste and abandoned waste disposal sites

16.10 - 16.30

I. Fleming, D. Stevens (CA)

Landfill gas well performance under short-term and long-term testing

16.30 - 16.50

S. Dever, T. Clingan, X. Wang, S. Bateman (AU)

Evaluating landfill gas emission at the Wollert landfill, Australia

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION B6 - *Paorama Hall*

Landfill gas cleaning

18.00 - 18.20

G. Mogensen, F. Huber, R. Ricci, A. Giordano, G. Garuti (DK)

Catalytic exhaust gas cleaning for power generating landfill gas engines

18.20 - 18.40

E. González, A. Ayats, J. Cabré, F. Relea, E. Jiménez, M. Haberbauer, F. Broto, L.L. Comellas, C. Ribas, G. Gotor, N. Vallmitjana (ES)

MICROPHILOX: Energy recovery from landfill gas using microturbines and biological removal of hydrogen sulphide and siloxanes

18.40 - 19.00

L. Lombardi, E. Carnevale, A. Corti, T. Olivieri (IT)

Biogas up-grading through carbon dioxide absorption with alkali solutions

19.00 - 19.20

T. Olivieri, L. Lombardi, P. Mostbauer (AT)

Demonstration scale upgrading of landfill gas with the use of bottom ash - BABIU process design and preliminary results

19.20 - 19.40 Discussion

SESSION C5

15.30-17.10

Waste management policy issues

M. Bocciarelli, T. Cocciardi, G. Bodini, M. Bergonzoni (IT)

Traceability of municipal solid waste as an innovative approach for proper and efficient integrated management on a regional scale

M.R. Berríos-Godoy (BR)

Challenges to apply the new Brazilian legislation on solid waste material

E. Schmied, S. Scherhauser, G. Obersteiner, U. Kabosch, A. Koblner, S. Stix (AT)

Formalisation options for informal sector activities and their legal requirement in Central Europe

O. Hjelmar, H.A. Van Der Sloot, R.N.J. Comans, M. Wahlström, O. Wik, E.A.A. Hansen (DK)

End-of-waste criteria for aggregates

G. Kirkos, K. Makris, M. Vatyliotou, D. Fatta-Kassinou (CY)

Evaluation of the implementation of the PPW and WEEE directives in island member states and member states that include islands

V.S. Rotter (DE)

Incentives for a recycling oriented waste management - Evaluation of instruments of extended and individual producer responsibility

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION C6

18.00-19.40

Supporting & decision tools in waste management

M.L. Mastellone, U. Arena (IT)

Waste management planning based on material and substance flow analyses

J. Silva, M. Nunes, D. Alves (PT)

Assessment of municipal waste operators: adapting the assessment framework to a new regulatory context

D.B. Hanan, S.J. Burnley, D.F. Cooke (GB)

The use of multicriteria decision analysis (MCDA) to determine community views on municipal waste management proposals

A. Magrini, D.B. Viana, M.G. Araujo (BR)

The "Samambaia model": a multicriteria tool for management of contaminated areas

S.Y. Kim, T. Furuichi, K. Ishii, K. Kurano (JP)

Proposal of cleanup program incorporated with follow-up plan for illegal dumping sites

SESSION D5

15.30-17.10

Geophysical methods in landfill investigations

S. Heuss-Aßbichler, D. Sager, E. Niesner (DE)

Application of geophysical methods to investigate the structure of a MSWI landfill

S. Moreau, N. Guyomar (FR)

Inversion software of electrical resistivity measurements to observe leachate recirculation in bioreactor landfills

R. Thiel, J.P. Giroud (US)

Important considerations for leakage control of exposed geomembrane-lined ponds

H. Rosqvist, T. Dahlin, V. Leroux, M. Svensson (SE)

Development of 3D geoelectrical resistivity for mapping of gas migration in landfills

S. Thorneloe, E. Thoma, M. Modrak, S. Amin (US)

Measurement of landfill gas emission using optical remote sensing technology to quantify methane abatement efficiency

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION D6

18.00-19.40

Impact on groundwater from landfills

H. Scharff, A. Van Zomeren (NL)

Landfill end point criteria for groundwater impact

E. Bietlot, L. Lebrun, C. Collart (BE)

Environmental monitoring on MSW landfill sites in Wallonia: overview on 10 years of field measurements

K. Haarstad, T. Mæhlum (NO)

Tracing solid waste leachate in groundwater using ^{13}C

R. Cossu, T. Lai, R. Raga (IT)

Controversial environmental impact from landfills: two case studies in Northern Italy

I.M. Rafizul, M. Alamgir, M.M. Islam (BD)

Evaluation of contamination potential of sanitary landfill lysimeter using leachate pollution index

SESSION E5

15.30- 17.10

Bottom & fly ashes from different sources

P. Mostbauer, R. Angermeier (AT)

Evaluation of methods for determination of residual metal content in upgraded MSWI bottom ash fractions

G. Valentini, S. Vasarelli, M. Franceschi, F. Braca, A. Cecchi (IT)

Physical models of fly ash as a tool for predicting heavy metals mobility and improving the efficiency of stabilization processes

D. Nordmark, A. Lagerkvist, J. Vestin, M. Arm, B. Lind, P. Hallgren (SE)

Environmental and mechanical assessment of wood fly ash used for stabilisation of gravel roads

H. Weigand, M. Bertau, F. Bohndick, A. Bruckert (DE)

RecoPhos: full-scale recovery of phosphate from sewage sludge ash

S. Rocca, A. Van Zomeren, G. Costa, J.J. Dijkstra, R.N.J. Comans, F. Lombardi (IT)

Interpretation on loss of ignition measurements of waste incineration bottom ash by thermogravimetry and mass spectrometry of evolved gasses

A. García-Maraver, M. Zamorano, A. Ramos-Ridao, L.F Díaz (ES)

Comparative study of cleaning methods for residues from olive tree pruning

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION E6

18.00-19.40

Waste pre-treatment: MBT

B. Scaglia, S. Salati, A. Di Gregorio, A. Carrera, F. Adani (IT)

Short mechanical biological treatment of MSW plus controlled storing in landfill: a new approach to produce recalcitrant residue that acts as C-sink in the landfill

E. Binner, P. Lechner (AT)

Measurement of respiration activity (AT_4) - Comparison of 169 samples measured by Sapromat and OxiTop

G. D'Imporzano, F. Adani, A. Forte, A. Giardiello, D. Richichi (IT)

Revamping of full scale MBT plant to biodrying plant to produce high quality solid recovered fuel

M. Molena, R. Göschl, M. Götz (AT)

Anaerobic biological treatment of organic fraction from MSW and industrial waste at Benesov (CZ): experiences, results and interpretation of two years operation

D. Komilis, S. Gerassimidou, G. Kosmidis, V. Lazaridis, E. Mplouhou, V. Papanastassiou, S. Tsiptsi (GR)

Aerobic biological pretreatment of municipal solid wastes: effect of different pretreatment periods on anaerobic emissions

A. Cesaro, V. Belgiorno (IT)

Sonolysis and ozonation as pretreatment for anaerobic digestion of organic solid waste

SESSION F5

15.30-17.10

Workshop:

GHGs of biological leachate treatment in landfill sites

Introductory lectures:

T. Ishigaki (JP)

Landfill gas and leachate in Asia: co-beneficial approach on management of waste landfill

M. Yamada, T. Ishigaki, K. Endo, A. Tanaka, Y. Matsufuji (JP)

Evaluation of semi-aerobic landfill system as a co-benefit GHG mitigation technology

A. Tanaka, Y. Matsufuji, T. Fukushige, A. Nakamura (JP)

Biological leachate treatment technology by simple and low-cost method

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION F6

18.00-19.40

Workshop:

Leaching tests

Introductory lectures:

A. Van Zomeren, A. Keulen, R. Bleijerveld, H.A. Van Der Sloot (NL)

Durability and emissions from stabilised hazardous waste by field measurements, supporting the development of EU waste acceptance criteria for monolithic waste landfills

H. Modin, H. Palm, M. Van Praagh, K.M. Persson (SE)

Leaching test using samples from a modern, carbon-poor landfill

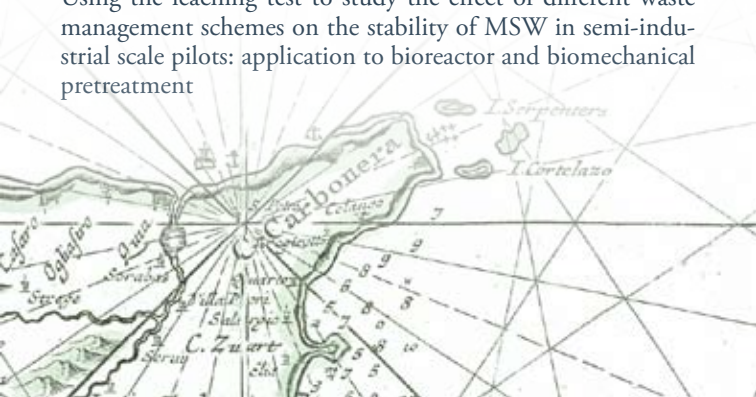
S. Thorneloe, A.C. Garrabrants, D.S. Kosson, G. Helms,

M. Baldwin (US)

Sustainable materials management using the leaching environmental assessment framework test methods

G. Feuillade-Cathalifaud, M. Leloup, V. Pallier, A.A. Mansour (FR)

Using the leaching test to study the effect of different waste management schemes on the stability of MSW in semi-industrial scale pilots: application to bioreactor and biomechanical pretreatment



SESSION G5

15.30-17.10

Workshop:

Fires in landfills

Introductory lecture:

M. Torode, R. Roussel, C. Lorton, P. Pointer, M. Caine (GB)

Extinguishing a sub-surface fire in a fully operational guernsey landfill site

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION G6

18.00-19.40

IWWG Workshop:

In situ aeration

Introductory lecture:

M. Ritzkowski (DE)

How does landfill aeration impact on leachate composition?



SESSIONE I5 (*in Italiano*) 15.30-17.10

Connubio innovativo “discarica - energia”

L. Lombardi, R. Baciocchi, E. Carnevale, A. Corti, G. Costa, X. Gabarrell, P. Mostbauer, F. Olivieri, T. Olivieri, A. Paradisi, K. Starr, G. Villalba, D. Zingaretti (IT)

Processi innovativi per l'up-grading del biogas

L. Lombardi, E. Carnevale (IT)

Ciclo rankine organico associato a motori a combustione interna per l'ottimizzazione di produzione di energia elettrica da biogas

D. Biondi, G. Cesari, F. Tinti (IT)

Una nuova opportunità per le discariche: lo stoccaggio di energia termica

A. Levorato, A. Atzori, A. Moretto (IT)

Riqualificazione della ex discarica per rifiuti mediante realizzazione di un parco fotovoltaico: la realizzazione e il monitoraggio ambientale

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSIONE I6 (*in Italiano*) 18.00-19.40

Raccolta differenziata: tra mito e realtà

R. Lisi, M. Marionni, A. Tolomei, R. Orsini, S. Leoni, E. Pettinao, M.G. Vetere (IT)

Sistemi di calcolo delle raccolte differenziate: stato dell'arte e prospettive per la omogeneizzazione dei sistemi di calcolo di valutazione delle RD alla luce del recepimento della direttiva europea

M. Ragazzi, E. Girelli, E.C. Rada (IT)

Proposta di linee guida per la raccolta differenziata in edifici istituzionali

G. Delbarba, S. Querci (IT)

Cogeme Gestioni e la raccolta differenziata globale. A tre anni dall'introduzione, i successi di un sistema

SESSION A7 - *Central Hall*

Biological waste treatment strategies

09.00 - 09.20

R. Inaba, K. Matsubashi, Y. Yuyama, S. Okamoto, S. Ito, H. Kurishima (JP)

Biomass utilization strategy aimed at regional activation

09.20 - 09.40

W. Hauer (AT)

Four pillars for the treatment of biowaste

09.40 - 10.00

G. Andreottola, M. Langone, E.C. Rada, M. Ragazzi (IT)

New energy saving concept in the integrated sewage sludge and organic fraction of solid waste treatment

10.00 - 10.20

J.L. Martel, A. Budka, O. Greze, M. Fontana Giusti, M. Rouez, M.R. Stambach (FR)

New solutions for producing biogas and good quality compost from municipal solid waste

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION A8 - *Central Hall*

Recycling strategies in developing countries

11.10 - 11.30

M. Sujauddin, S.M.A. Rahman, S. Murakami (JP)

Existing solid waste recycling system of Bangladesh and its future

11.30 - 11.50

G.T.R. Silveira (BR)

Cell phone recycling experiences in the world and potential recycling options for developing countries

11.50 - 12.10

Q.H. Bari, K.M. Hassan, R. Haque, M. Alamgir (BD)

Scenario of solid waste reuses in Khulna City of Bangladesh

12.10 - 12.30

S. Aparcana, R. Linzner, S. Salhofer (AT)

Material flow analysis of formal and informal household waste recycling systems in developing countries. Case study from Peru

12.30 - 12.50 Discussion

SESSION B7 - *Panorama Hall*

Measurement of landfill gas emission

09.00 - 09.20

P. Kjeldsen, C. Scheutz (DK)

Evaluating gas emission from landfills - Which methodologies can be used?

09.20 - 09.40

D. Picciaia, G. Zazzeri, M.S. Giamberini, P. Andreussi (IT)

A new remote sensing method for landfill emission quantification

09.40 - 10.00

T. Laurila, J. Hatakka, J.P. Tuovinen, K. Sormunen, K. Karhu, M. Uusihakala, M. Ettala (FI)

Monitoring of methane emissions by micrometeorological method at two modern bioreactors from the initial degradation phases to methane production

10.00 - 10.20

J.E. Bogner, K. Spokas, J. Chanton (US)

Comparative field measurement of greenhouse gas emissions from daily, intermediate, and final California landfill cover soils

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION B8 - *Panorama Hall*

Methane oxidation in landfill covers

11.10 - 11.30

I.U. Röwer, J. Gebert, J. Streese-Kleeberg, A. Gröngröft, S. Melchior, B. Steinert, E.M. Pfeiffer (DE)

Design, implementation and operation of soil-based methane oxidation windows for the remediation of gas emission hotspots in landfill cover soils

11.30 - 11.50

I. Pecorini, E. Carnevale (IT)

Reduction of hydrogen sulfide and methane emissions from landfills by use of biological active covers: lab and pilot scale studies

11.50 - 12.10

S. Bohn, J. Jager (DE)

Low gas emission of mechanically and biologically treated waste and microbial methane oxidation as an adapted method for mitigation of emissions

12.10 - 12.30

C. Scheutz, A.R. Meroño, R.B. Pedersen, P. Kjeldsen (DK)

Temperatures in compost landfill covers as a result of methane oxidation and compost respiration

12.30 - 12.50 Discussion

SESSION C7

09.00-10.40

Waste management in developing countries (II)

Q.H. Bari, M. Alamgir (BD)

Waste generation in cities of Bangladesh: a review and further estimation

J.G. Paul, M.A. Bandiez (PH)

Status of environmental education at elementary schools in Iloilo City, Philippines and options to enhance solid waste management habits at microlevel

G.N.K. Rockson, I.B. Acheampong, P.K. Dagadu, L.N.A. Sackey, M.Y. Mensah (GH)

Characterization of waste at the final disposal sites of five major cities in Ghana

M. Stepanovic, M. Vlahovic, P. Jovanic (SR)

Integrated treatment of the generated waste streams on the Djerdap dam

A.B. Farouque, N. Taj (PK)

Community based integrated solid waste management in developing countries - Green Town, Lahore (clean Pakistan)

F.A.O. Otieno, O.E. Taiwo (ZA)

Towards sustainable waste management: household habits with respect to waste disposal

10.40 - 11.10 Coffee Break

SESSION C8

11.10-12.50

Economical aspects in waste management

E. Shamsiry, B. Nadi, M. Bin Mokhtar, I. Komoo, H. Saadiyah Hashim (MY)

Optimization of energy and cost for municipal solid waste management

C. Machline, D. Del Bel, C. Caselani, P. Sandroni, V. Machline (BR)

Economics of sanitary landfills in Brazil

M. Gori, R. Gori, P. Sirini (IT)

Economic and environmental implications of sludge treatment and disposal strategies

Y. Matsui, D.T.T. Trang (JP)

Behavior modification mechanism of discharge fee system on household solid waste

J.C. Silva, A. Cunha (PT)

Organic recovery: Portuguese waste sector tariff impact

J. Byström (LU)

Eco efficiency, a path towards integrated resource management

SESSION D7

09.00-10.40

Landfill gas generation & modeling

J. Mønster, Z. Mou, P. Kjeldsen, C. Scheutz (DK)

Comparison of four landfill gas models using data from four Danish landfills

A. Pukhnyuk, M. Ritzkowski, Y. Matveev (UA)

Verification of landfill gas production model results for Ukrainian MSW landfills

C.J. Cronin, P. Kelly, T. Ruddy, D. Smyth, S. Meyler (IE)

A spreadsheet tool to calibrate LandGEM™ gas modeling prediction software for site specific MSW facilities using data from gas extraction audits

J.R. Belouschek, R. Widmann, T. Ricken (DE)

Coupled 3D-FEM-simulation of organic degradation in landfills - Practical experience

O. Hirata, Y. Matsufuji, A. Tachifuji, R. Yanase, H. Matsunaga (JP)

Biodegradation process and mass balance of different landfill types using large-scale lysimeter - Study on the estimation of GHGs emission by mass balance with semi-aerobic and anaerobic landfill type

10.40 - 11.10 Coffee Break

SESSION D8

11.10-12.50

Anaerobic waste degradation in landfills

D. Rivière, V. Vigneron, N. Baffaleuf, G. Le Lay, M. Guerbois, J. Cacho Rivero (FR)

Diagnostic of a French bioreactor landfill after 8.5 years of degradation

H.X. Nguyen, B. Bilitewski (VN)

Leaching on heavy metals in high organic municipal solid waste landfill

D. Komilis, I. Markidis, D. Dermatas, F. Tsagas (GR)

Degradation of municipal solid wastes stored in bales: a fractional factorial field experiment

R. Bayard, H. Benbelkacem, R. Gourdon, J.P Gourc (FR)

Mass balance on water and dry solids from pilot-scale landfill bioreactor studies

SESSION E7

09.00-10.40

Waste generation, reduction & collection

V.E. Schneider, M.D. Silva, R. Finkler, D. Peresin, E.M.T. Motta (BR)

Evaluation of municipal solid waste generation in neighboring Caxias do Sul/Brazil

C. Stiglitz (AT)

Refilling and recycling of beverage packaging as contribution to waste reduction - New results in the old discussion

A. Bernstad, J. La Cour Jansen (SE)

Need for improvements in pre-treatment of source-separated household food waste

N. Qamaruz-Zaman, M.W. Milke (MY)

VFA and ammonia emission during separate collection of residential food waste as a measure of odour potential

A. Schueler, W. Mary, W. Fernandes (BR)

Solid waste production and treatment in Federal Rural University of Rio de Janeiro, Brazil - searching for zero waste

K. Gjoka, G.J. Ikonomi, D. Shutina (AL)

Waste characterization audit in Albania. Potentials for waste recovery and reduction

10.40 - 11.10 Coffee Break

SESSION E8

11.10-12.50

Construction & demolition waste (II)

R.A. Medeiros Junior, S.P. Fucale, A.D. Gusmao, A.B. De Farias (BR)

Analysis on feasibility of using of civil construction waste as recycled aggregate in compaction piles for soil improvement

Y. Park, S. Yun, J. Lee, J. Won, Y. Kim (KR)

A process for utilization as solid fuel of combustible C&D waste

I.D. Williams, D.A. Turner (GB)

Waste management practises in the small-scale construction industry

A.A.P. Buselli, I.C.D. Azevedo, E.A.G. Marques, R.R. Moraes, B.N. Brito, L.C.R. Andrade (BR)

Evaluation of construction and demolition waste management in Viçosa Municipality, MG, Brazil

R. Bezjak, V. Grilc (SI)

Thermal recycling of waste glass wool insulation materials

SESSION F7

09.00-10.40

Workshop:

Safety & health issues in waste management

Introductory lectures:

C. Capitano, E. Voudrias (GR)

Safety and health in mechanical-biological treatment plants

V. Grundmann, B. Bilitewski, D. Barceló (DE)

Environmental and health risks of chemical additives and recycling materials

M.A. Azevedo, M.D Oliveira (BR)

Evaluation of environmental impact and health effects caused by municipal solid waste disposal in Minas Gerais State, Brazil

M.A. Azevedo (BR)

Diarrhoea morbidity associated with residence near a municipal solid waste landfill

E. Davoli, G. Bianchi, A.N. Rossi, S. Bonati, M. Il Grande, M. Facchetti, M. Giorgi (IT)

Occupational health risk in landfilling

M.F.S. Pinheiro, Y.D.B. Almeida, C.B. Junior, J. Fein (BR)

Use of odor perception to assess the environmental effect of improvements on a garbage transfer station in Sao Paulo Brazil

10.40 - 11.10

Coffee Break

SESSION F8

11.10-12.50

Workshop:

GHG emissions from different waste management scenarios

Introductory lectures:

C. Wünsch, B. Bilitewski (DE)

Comparison of greenhouse balances between dumping, sanitary landfilling and incineration of residual waste

N. Yang, X. He, F. Lu, M. Chen, L.M. Shao, P.J. He (CN)

Green house gases emission from waste-to-energy incineration in China

W. Ma, Y. Wang, J. Liu, G. Chen (CN)

Impact of MSW management on GHG emission: case study of China

SESSIONE I7 (*in Italiano*) 09.00-10.40

Trattamento termico dei rifiuti: tante opzioni, scelte sofferte

U. Arena (IT)

Una valutazione critica dei processi della gassificazione dei rifiuti solidi urbani

M. Seggiani, A. Bellini, S. Vitolo, M. Puccini, G. Raggio (IT)

Cogassificazione di fanghi da depurazione in un gassificatore updraft

E.C. Rada, M. Ragazzi, M. Marconi, A. Chistè, M. Schiavon, M. Tubino (IT)

Diossine e ruolo del settore rifiuti: un esempio.

10.40 - 11.10 Coffee Break

SESSIONE I8 (*in Italiano*) 11.10-12.50

Scorie e ceneri: opzioni credibili di inertizzazione e/o riuso

A. Gianoncelli, F. Marciano, A. Zacco, R. Ardesi, G. Rizzo, E. Bontempi, L.E. Depero (IT)

Applicazione di un processo innovativo di inertizzazione delle ceneri leggere da incenerimento di rifiuti solidi urbani: prime prove meccaniche

S. Rocca, A. Van Zomeren, G. Costa, J.J. Dijkstra, R.N.J. Comans, F. Lombardi (IT)

Comportamento ambientale di scorie di fondo da incenerimento rifiuti ospedalieri in relazione ad opzioni di riuso/smaltimento

R. Melotti, E. Santagata, M. Bassani, M. Salvo, S. Rizzo (IT)

Caratterizzazione delle ceneri da combustione di biomassa da utilizzare come filler nei conglomerati bituminosi

R. Onori, A. Poletti, R. Pomi (IT)

Modellizzazione della lisciviazione di scorie di fondo di termovalorizzazione attivate in cementi di miscela

P. Plescia, E. Tempesta, F. Trapasso, E. Barbarese, O. Cerri

Recupero di scorie siderurgiche e da termodistruzione per produrre idrogeno e catturare CO₂

SESSION A9 - *Central Hall*

Waste treatment: MBT, RDF

15.30 - 15.50

D. Burgess, L. Carrabin, R. Kirkman, J. Gronow, N. Voulvoulis (GB)

A mass and energy balance multi-criteria assessment for waste management options in the UK

15.50 - 16.10

R. Cossu, T. Lai (IT)

Washing treatment of waste before landfilling

16.10 - 16.30

L. Brunn, S. Mattersteig, B. Bilitewski, M. Friese (DE)

Biological filtering of organosilicon compounds in exhaust gas streams of mechanical-biological treatment plants

16.30 - 16.50

A.A. Siddiqui, D.J. Richards, W. Powrie (IN)

Investigation into the landfill behaviour of pretreated waste

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION A10 - *Central Hall*

Companies Forum: Innovative Technologies

18.00 - 18.20

C. Gonella (IT)

Preparation of biological waste and municipal solid waste using the press-extrusion process

18.20 - 18.40

R. Schu, K. Schu (CH)

Modernization of a Swiss MBT-plant with SCHUBIO®-process to a TSS-plant

18.40 - 19.00

M.D'Aquino (IT)

Nord Engineering : new waste collection system

19.20 - 19.40

E. Friz (IT)

The Ecodeco technology and its applications in Italy and abroad

19.20 - 19.40 Discussion

SESSION B9 - *Panorama Hall*

Materials for methane oxidizing covers

15.30 - 15.50

M. Huber-Humer, K. Böhm, J. Tintner, P. Lechner (AT)

New approach to assess the suitability of substrates for methane oxidation purposes

15.50 - 16.10

M. Létourneau, A.R. Cabral, T. Johnson (CA)

Evaluation of candidate materials for the construction of a biocover

16.10 - 16.30

C.D. Roncato, M.A. Capanema, A.R. Cabral (CA)

Evaluating methane oxidation efficiencies of soils contaminated with heavy metals

16.30 - 16.50

W. Stępniewski, M. Pawłowska (PL)

Evaluation of perlite-based material as a potential bed of methanotrophic biofilter

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION B10 - *Panorama Hall*

Semi-aerobic landfills

18.00 - 18.20

M. Yamada, K. Endo, T. Ishigaki, K. Wangayo, N. Sutthasil, C. Chiechaisri (JP)

A test cell experiment on semi-aerobic landfill system for tropical countries

18.20 - 18.40

H. Yoshida (JP)

Analysis of in situ passive aeration of a closed landfill for reduction of methane gas emission

18.40 - 19.00

T. Shimaoka, T. Komiya, G. Jiao, Y. Hao, X. Chai, Y. Zhao (JP)

Optimum air injection manner for the stabilization of landfill adopting the aerobic-anaerobic method

19.00 - 19.20

W.J. Van Vossen, A. De Vos (NL)

Sustainable emission reduction of ammonium from a landfill body using the anammox-process at the Vlagheide landfill in Schijndel (NL)

19.20 - 19.40 Discussion

SESSION C9

15.30-17.10

Minimization of GHG emissions in waste management

M. Van Brunt, B. Bahor (US)

Global energy and greenhouse gas savings through sustainable waste management

L. Gómez, M.M. García, E. Marañón, L. Castrillón, Y. Fernández-Nava (ES)

Pilot case study: application of a methodology to determine greenhouse gas emissions reduction from manure co-digestion systems

M. Hudgins, L. Green (US)

Greenhouse reduction methodology validation of in-situ aerobic stabilization - A guide to sampling and analyses under AM0083

T. Bramryd, M. Johansson (SE)

Landfills as moderators for climate change based on a combination of enhanced biogas extraction and sequestration of remaining long-lived organic matter in the landfill

E. Matthews, E. Baum (US)

Projections of methane emission and mitigation, 2000-2030

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION C10

18.00-19.40

Life cycle analysis of energy recovery from waste

S.J. Burnley, R. Phillips, T. Coleman (GB)

A life cycle assessment of recovering energy from the organic fractions of municipal waste

R. Turconi, S. Butera, A. Boldrin, M. Grosso, L. Rigamonti, T. Astrup (DK)

LCA comparison of waste incineration in Denmark and Italy

L. Lombardi, A. Corti, G. Del Balio (IT)

Life cycle assessment comparison of traditional and innovative technologies of energy recovery from waste

L.K. Brogaard, T.H. Christensen (DK)

Life cycle assessment of capital goods related to waste incineration

L. Ziyang, Z. Nanwen, L. Bing, C. Xiaoli, Z. Youcai, B. Bilitewski (DK)

The Development Process of Municipal Solid Waste Incineration in China

SESSION D9

15.30-17.10

Landfill leachate treatment: nitrogen removal

H. Robinson, M. Carville, P. Bailey, S. Farrow, J. Olufsen, D. Jones, L. Gibbs (GB)

Full scale treatment of landfill leachates with full nitrification and denitrification

M. Galleguillos, J.L. Vasel (BE)

Optimisation of N removal in landfill leachates treatment with membrane bioreactor: pilot plant and full scale studies

M. Langone, V. Miotto, G. Andreottola

Landfill-leachate treatment: innovative autotrophic biological processes for the nitrogen removal

R. Damięcki, W. Kirchhof (DE)

Optimization of the leachate treatment technology in tropical conditions regarding energy savings by applying the deammonification process, Kuching, Sarawak, Malaysia

R. Frank, C. Trois, F. Coulon (ZA)

Bio-denitrification of high strength leachate using garden refuse and pine bark as a carbon source

B. Plug, C. Trois (ZA)

Bio-denitrification of MSW landfill leachate using raw and composted garden refuse: a comparative analysis

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION D10

18.00-19.40

Landfill leachate treatment: methods for volume reduction

A. Ferrari, I. Pradella (BR)

Leachate management with an evaporator using biogas and lagoons with floating cover in a Brazilian sanitary landfill. A case study

T. Peters (DE)

Volume minimization for improving leachate management using seeding technology, nanofiltration and hydro cyclon classification

D. Fatutto, C. Del Piccolo, R. Fontana (IT)

Landfill leachate treatment through reverse osmosis and evaporation technologies: from the sample analysis to the plant start-up

K. Sormunen, M. Valtari, J. Taskinen, M. Uusihakala, T. Laurila, M. Ettala (FI)

Leachate quality and water balance at a new bioreactor landfill

F.M. Ferraz, J. Povinelli, E.M. Albuquerque (BR)

Landfill leachate pretreatment using an air stripping packed

SESSION E9

15.30-17.10

Investigation of the gas production potential

F. Di Maria, A. Sordi, C. Micale (IT)

Experimental evaluation of the residual biogas potential for MSW organic fraction after composting treatment

T. Chantou, G. Feuillade-Cathalifaud, D. Mausset, J. Bouzid, G. Matejka (FR)

Application of respirometric tests and organic matter fractionation as indicators of waste stabilization

P.P. Cella Mazzariol, G.F. Galanzino, C. Ubbiali (IT)

Assessment of BMW diversion achieved in the UK by MBT biostabilization system

L. Carvalho, S. Di Bernardino, E. Duarte (PT)

Biogas production from Mediterranean crop silages

I. Pecorini, T. Olivieri, A. Paradisi, D. Bacchi, G. Cenni, L. Burberi, L. Lombardi, A. Corti (IT)

Biochemical methane potential of organic municipal solid waste components in order to determine gas production in an industrial scale of anaerobic digesters

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION E10

18.00-19.40

Material recovery from special waste

A. Mrotzek, H. Lohmann (DE)

Identification and recovery of critical materials of secondary sources

S. Kashiwakura, Y. Kumagai, K. Wagatsuma (JP)

Recovery of rare-earth elements from coal fly ash particles generated from coal-fired electric power stations with the aid of Acid Washing Process

A. Pineda, A. Lozano, I. Aracil, A. Fullana (ES)

Recovery of the components of waste ink from printing industries

S. Migneault, A. Koubaa, B. Riedl, H. Nadji, J. Deng (CA)

Recycling pulp and paper sludge in medium density fiberboard products

SESSION F9

15.30-17.10

Workshop:

Pyrolysis & gasification (III)

Introductory lectures:

M. Nieminen, J. Ranta, J. Laatikainen-Luntama (FI)

Upgraded waste fuel for gasification and high efficiency energy production

P. Danz, S. Wirtz, J. Behling, B. Brosch, T. Marzi (DE)

New approach of simulating RDF combustion via discrete element method using experimental pyrolysis and combustion data from a pilot scale plant

L. Zhao, D. Chen, X. Ma, Z. Zhou (CN)

Pyrolysis of waste separated from municipal solid waste: products, emissions and influences caused by other waste components

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION F10

18.00-19.40

IWWG Workshop:

Leach XS

Introductory lecture:

H.A. Van Der Sloot, D.S. Kosson, O. Hjelmar, R.N.J. Comans, A. Van Zomeren (NL)

Leaching and composition database for waste management



SESSION G9

15.30-17.10

Workshop:

Impact of pretreatment on landfill gas generation

Introductory lectures:

A.A. Mansour, A. Motte, V. Pallier, G. Feuillade-Cathalifaud, A. Ponthieux (FR)

Assessment of the aerobic preparation and bottom ash addition as pretreatment steps before landfilling of fresh municipal solid waste: impact on methanogenesis kinetics and leachate parameters

D. Yue, Y. Zhang, Z. Yu, J. Liu, Y. Nie (CN)

Effect of aerobic pretreatment degree of municipal solid waste on gas generation during landfilling

F. Di Maria, F. Valentini (IT)

Effect of MSW aerobic pre-treatment on biogas potential for bioreactor landfill: experimental analysis

C. Dornack, C. Münch, P. Gutsche (DE)

Stabilization of the biogas production from residues from the dairy industry by various pre-treatments

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION G10

18.00-19.40

IWWG Workshop:

Thermal Treatment

Introductory lectures:

U. Arena (IT)

Advanced aspects of combustion and gasification processes for thermal treatment of municipal solid waste

A. Suzuki, S. Nagayama (JP)

High efficiency WtE power plant using high-temperature gasifying and direct melting furnace

E.C. Rada, M. Ragazzi, M. Marconi, A. Chiste, M. Schiavon, M. Tubino (IT)

Dioxin and waste sector role: an example

S. Consonni (IT)

Waste gasification and energy efficiency

A. Wohlleben (DE)

Recent advanced solutions in combustion-based WtE units

SESSIONE I9 (*in Italiano*)

15.30-17.10

La discarica bioreattore con ricircolo del percolato: opzione fattibile?

P. Simone, A. Bracci, L. Nettuno (IT)

Bioreattore: stato dell'arte e scenari di sviluppo in italia

M.C. Di Lonardo, F. Lombardi, S. Pantini, I. Verginelli, P. Sirini, F. Ermolli (IT)

Applicazione ad un caso reale di un modello per la stima della produzione del percolato in discarica

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSIONE I10 (*in Italiano*)

18.00-19.40

Impatto ambientale delle discariche: "diffamazione" o realtà?

E. Davoli, G. Bianchi, A.N. Rossi, S. Bonati, M. Il Grande, M. Facchetti, M. Giorgi (IT)

Rischio occupazionale per la salute nelle discariche controllate

I. Bortone, S. Carrillo, A. Di Nardo, M. Di Natale, D. Musmarra (IT)

Mitigazione dell'esposizione da sostanze odorose per una discarica di rifiuti inserita in un territorio ad elevata urbanizzazione

A. Scalabrin, S. Cestaro, M. Zanella, M. Bellardi, B. Montebovi, L. Schiavon, M. Ostoich (IT)

Proposta metodologica per la definizione dei valori di fondo nelle acque sotterranee in prossimità della discarica di San Donà di Piave.

R. Cossu, T. Lai, R. Raga (IT)

Aspetti controversi dell'impatto ambientale delle discariche: due casi di studio in Nord Italia

SESSION A11 - *Central Hall*

Composting

09.00 - 09.20

C. Springer, W. Bidlingmaier (DE)

Energy and CO₂ - Balance of composting, including energy consumption and compost application

09.20 - 09.40

A. Boldrin, J.K. Andersen, T.H. Christensen, C. Scheutz (DK)

Environmental aspects of home composting of organic household waste

09.40 - 10.00

A. Fernando de Fuentes, R. Torrejón Gómez, J.V. López Álvarez, M. Gómez Paniagua, M.P. Arraiza Bermudez-Cañete (ES)

Analysis of starch-polyester shopping bag biodegradation in a composting plant: comparison between pilot and industrial experiences

10.00 - 10.20

I. Zdanevitch, O. Bour (FR)

Quality of composts from municipal biodegradable waste of different origins

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION A12 - *Central Hall*

Anaerobic digestion

11.10 - 11.30

F. Moedinger, F. Ast, M. Ragazzi, P. Foladori, E.C. Rada, R. Binnig (IT)

Innovative biogas multi-stage R&D plant - Preliminary project experiences

11.30 - 11.50

G. Ekama (ZA)

Characterization of organic wastes with a mass balance based steady state model for anaerobic digestion

11.50 - 12.10

L. Weitze, E. Kraft (DE)

Optimization of the anaerobic process with empirical knowledge-based control systems

12.10 - 12.30

M. Vlachopoulou, E. Iacovidou, G. Ohandja, J. Gronow, A. Butwell, N. Voulvoulis (GB)

The anaerobic digestion of food waste: using the model ADM1 to simulate its performance and assess its potential as a waste management option

12.30 - 12.50 Discussion

SESSION B11 - *Panorama Hall*

Landfill barrier systems

09.00 - 09.20

V. Hruby, S. Barrie (SK)

Feedback notes to assist landfill designers

09.20 - 09.40

A. Witzsche, J. Weiß (DE)

New and alternative barrier systems – quality assurance during construction and efficiency control in the aftercare period

09.40 - 10.00

S. Puma, A. Dominijanni, M. Manassero, D. Toncelli, F. Trotta, M. Zanetti (IT)

Hydraulic performance of a natural bentonite GCL in inorganic solutions and polymer treatment proposal to prevent degradation in long term landfill conditions

10.00 - 10.20

K. Yokohata, F. Takahashi, T. Shimaoka (JP)

Adsorption behavior of fulvic acid, copper, and their complex onto clay minerals

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION B12 - *Panorama Hall*

Phytocaps for landfills

11.10 - 11.30

S.T.S. Yuen, M. Salt, J. Sun, P. Benaud, G.X Zhu, M.B. Jaksa, H. Ghadiri, M. Greenway, N. Ashwath, A.B. Fourie (AU)

Phytocapping as a sustainable cover for waste containment systems: experience of the A-ACAP study

11.30 - 11.50

P. Lightbody, M. Salt, J.W. Cox, M.B. Jaksa (AU)

Modelling phytocap (evapotranspiration cover) designs using WAVES (Water Atmosphere Vegetation Energy and Solutes) model - Design & calibration

11.50 - 12.10

J. Sun, S.T.S. Yuen, J. Bogner, D. Chen (AU)

Investigation of phytocap methane oxidation and emission: a full scale field trial and a controlled glasshouse experiment

12.10 - 12.30

K.D. Kim (KR)

Vegetation dynamics on waste landfills in Seoul metropolitan area

12.30 - 12.50 Discussion

SESSION C11

09.00-10.40

Recycling of packaging materials & different plastics

R. Torrejón Gómez, A. Fernando de Fuentes, J.V. López Álvarez, M.P. Arraiza Bermudez-Cañete (ES)

Packaging: part of our every day

R. Bozovic, I. Pavlovic, C. Stiglitz (SR)

Packaging recovery in non-EU European countries: Serbia

R. Meoni, M. Castellani, C. Cecchi, I. Pecorini, A. Corti (IT)

A pilot separation plant: plastic recycling implementation to elide landfilling

A. Kriekouki, J. Gronow, R. Kirkman, L. Carrabin, N. Voulvoulis (GB)

The way forward in assessing options for municipal waste management: the treatment of mixed plastics as a case study

A. Bartl, D. Pico (AT)

From GFRP to GFRP recycleability of fiber reinforced plastics

M. Rudowski, M. Kozłowski (PL)

Modification of properties of polymeric materials from electrical and electronic waste

10.40 - 11.10 Coffee Break

SESSION C12

11.10-12.50

Local waste management strategies

A. Schüch, F. Höfs, B. Lüdecke, S. Lösel, M. Nelles (DE)

Local waste management strategies for integrated solutions for the biodegradable fraction of municipal solid waste in rural areas

T. Lolos, C. Tsompanidis, G. Lolos, K. Paschali, C. Raptis (GR)

Achieving legislation targets via an integrated waste management facility: Cyprus case study

G.A. Blengini, G. Genon, M. Fantoni (IT)

LCA of integrated municipal solid waste management systems: case studies of Torino & Cuneo (Italy)

E. Gunsilius, S. Spies, S. García-Cortés (DE)

The informal sector in SWM - Economic arguments and political framework for its integration

J.G. Paul, J. Jaque, N. Ravena, S. Villamor (PH)

Strategies to establish new livelihood as a precondition for informal sector integration into the municipal solid waste management program at Calahunan dumpsite in Iloilo City, Philippines

SESSION D11

09.00-10.40

Case studies in landfill gas utilization

N. Kohler, R.G. Gregory, D. Cornish (GB)

Developing landfill gas to energy systems in South Africa

L.R. Tovar, R.A. Castro, M.E. Gutiérrez (MX)

Landfill gas availability in Mexico City Bordo Poniente Stage IV

P. Kouvo (FI)

Combined engine and ORC-process landfill gas power plant

R. Goldstein, P. Brown, R. Ganguli (GB)

Landfill gas to energy project case studies: a global perspective on approaches and resources for reducing methane emissions

R. Baciocchi, G. Costa, G. Fraoni, L. Lombardi, T. Olivieri, D. Zingaretti (IT)

Pilot-scale carbonation of APC residues for CO₂ storage and alkali regeneration downstream. An absorption column for biogas upgrading

10.40 - 11.10 Coffee Break

SESSION D12

11.10-12.50

Alternatives in landfill leachate treatment

A. Spagni, S. Grilli, F. Piccinelli, S. Casu, R. Farina (IT)

Effect of the nitrate and nitrite addition on leachate characteristics in a simulated landfill bioreactors

A. Tachifuji, Y. Matsufuji, A. Nakamura (JP)

Simple leachate treatment with on site materials and wastes

S. Fudala-Ksiazek, A. Luczkiewicz, B. Quant, K. Olanczuk-Neyman (PL)

The effectiveness of nitrification and denitrification with co-treatment wastewater with landfill leachate

K.H. Preussler, L.T. Maranhão, C.F. Mahler (BR)

Phytoremediation and renewable energy production in landfill of Caximba, Curitiba, Parana, Brazil

SESSION E11

09.00-10.40

Pyrolysis & gasification (II)

G. Del Alamo, A. Hart, A. Grimshaw, P. Lundström (NO)

Characterisation of syngas produced from MSW gasification at commercial-scale ENERGOS plants

E. Allegrini, A. Boldrin, R. Pomi, A. Polettoni, T. Astrup (DK)

Biomass gasification residues: leaching and disposal options

A. Adrados, I. De Marco, A. López, B.M. Caballero, M.F. Laregoiti (ES)

Characterization of the rejects of waste packaging separation plants: pyrolysis of individual and families of components

H. Wang, D. Chen, Z. Wang, X. Ma, G. Zhou (CN)

Morphological characteristics of waste plastics pyrolysis process and their application for process control

10.40 - 11.10 Coffee Break

SESSION E12

11.10-12.50

Bottom ashes: stabilization and utilization

R. Onori, A. Polettoni, R. Pomi (IT)

Leaching modelling of activated incinerator bottom ash in cement blends

N. Lapa, R. Barbosa, B. Mendes (PT)

Intrinsic properties of new materials for civil engineering works based on the reuse of MSWI bottom ashes: chemical and ecotoxicological assessment

M. Gori, B. Bergfeldt, J. Reichelt, P. Sirini (IT)

Effect of natural ageing on volume stability of MSW and wood waste incineration residues

F. Takahashi, T. Shimaoka (JP)

The weathering of municipal solid waste incineration bottom ash evaluated by some weathering indices for natural rock profiles suggested in the mineralogy

S. Rocca, A. Van Zomeren, G. Costa, J.J. Dijkstra, R.N.J. Comans, F. Lombardi (IT)

Leaching properties of hospital waste incineration bottom ash in relation to disposal or re-use option

SESSION F11

09.00-10.40

IWWG Workshop:

WEEE recovery & recycling

Introductory lectures:

E. Mueller, M. Schluep, Y. Amoyaw-Osei, S. Prakash, T. Terkhova (CH)

e-Waste management in Ghana: a country massflow assessment

M. Fuccaro, P. Simeoni, G. Nardin (IT)

Recovery of small size electric and electronic waste and durable goods for the second-hand market: a case study in the Municipality of Udine

10.40 - 11.10

Coffee Break

SESSION F12

11.10-12.50

IWWG Workshop:

Industrial Waste Management

Introductory lectures:

E. Gidaragos (GR)

Industrial waste management. What does the industry still need?

A. Mattiussi, M. Rosano, P. Simeoni (IT)

Waste management in an industrial park- industrial ecology benefits

K.D. Govender, J.K. Filitz (ZA)

A mixed methods design to assess corporate attitudes towards industrial ecology: advancing sustainable waste management

M. Goudier, M. Choura, R. Halouani (TN)

Confinement as a sustainable route to phosphogypsum management

SESSION G11

09.00-10.40

IWWG Workshop:
Sustainable landfilling

Introductory lecture:

H. Scharff (NL)

Clarification of functional stability in the framework of after-care completion

10.40 - 11.10 Coffee Break

SESSION G12

11.10-12.50

IWWG Workshop:
Sustainable landfilling

In session G12 the debate started in the previous Session G11 will be continued.



SESSIONE I11 (*in Italiano*)

09.00-10.40

La copertura delle discariche: come e quando

I. Pecorini, A. Corti (IT)

Efficacia di differenti coperture di discarica e comparazione campagne di monitoraggio emissioni CH_4

I. Pecorini, E. Carnevale (IT)

Mitigazione emissioni di H_2S e CH_4 da discarica mediante coperture bio-attive: studi a scale di laboratorio e pilota

M.C. Lavagnolo, R. Cossu, M. Malagoli, L. Alibardi (IT)

Utilizzo delle superfici delle discariche per la produzione di colture energetiche

10.40 - 11.10

Coffee Break

SESSIONE I12 (*in Italiano*)

11.10-12.50

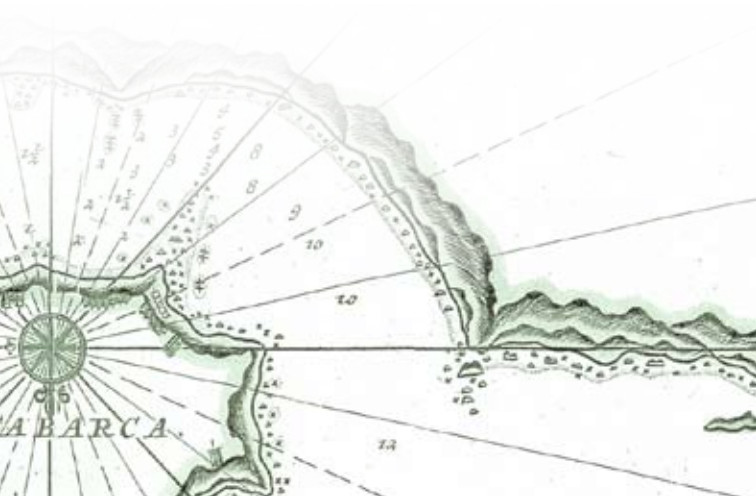
Post gestione dei rifiuti: come condizionarla e controllarla

R. Cossu, T. Lai (IT)

Lavaggio dei rifiuti prima del deposito in discarica

R. Meoni, I. Pecorini, C. Meoni, A. Mazzetti (IT)

Piano di monitoraggio e post-esercizio di una discarica per RSU: approccio di utilizzo di spazi inutilizzabili



SESSION A13 - *Central Hall*

Biological hydrogen production

15.30 - 15.50

R. Brunstermann, R. Widmann (DE)

Stability of bio-hydrogen production by dark fermentation

15.50 - 16.10

G. Cappai, G. De Gioannis, G. Giordano, A. Muntoni, A. Poletini, R. Pomi, D. Spiga (IT)

Batch hydrogen production from food waste

16.10 - 16.30

L. Tuccinardi, S. Scaffoni, M.R. Boni (IT)

Hydrogen production from household waste in semicontinuous reactor: selection of the optimal operating conditions

16.30 - 16.50

X.M. Guo, E. Latrille, E. Trably, H. Carrere, J.P. Steyer (FR)

Correlation analysis with PLS regression of biological hydrogen potential (BHP) tests of solid organic waste.

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION A14 - *Central Hall*

Incineration of waste (I)

18.00 - 18.20

E.C. Rada, E. Girelli, E. Mallocci, G. Andreottola (IT)

Consequences of regulation evolution on the sector of RDF/SRF

18.20 - 18.40

H. Song, E. Thorin, E. Dotzauer, E. Nordlander, J. Yan (SE)

Modeling and optimization of a regional waste-to-energy system: a case study in central Sweden

18.40 - 19.00

M. Nelles, T. Dorn, K. Wu, J. Cai (DE)

Status, problems and solutions of waste incineration in China

19.00 - 19.20

M.A.J. Van Berlo, P. Simoes (NL)

High-efficiency waste-to-energy: Amsterdam's experiences after 4 years of operation

19.20 - 19.40 Discussion

SESSION B13 - *Panorama Hall*

Landfill leachate treatment: biological methods

15.30 - 15.50

A. Butkovskiy, K. Jönsson (SE)

Application of biological and chemical treatment for removal of organic matter from leachate

15.50 - 16.10

H. Robinson, K. Wilson, M. Carville, R. Sibley (GB)

Treatment of leachate at an old landfill in Sussex, UK

16.10 - 16.30

A. Žgajnar Gotvajn, G. Kalčíkova, J. Zacorc-Končan (SI)

Lab-scale simulation of biological treatment of mature landfill leachate

16.30 - 16.50

J. Wu, Z. Zhou, J. Wang, L. Cao, D. Cai (CN)

Aged refuse reuse for rural decentralized sewage treatment: the humified media filter process from laboratory study to full-scale application

16.50 - 17.10 Discussion

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION B14 - *Panorama Hall*

Landfill aeration

18.00 - 18.20

M. Ritzkowski, R. Stegmann (DE)

Landfill aeration worldwide: concepts, indications and findings

18.20 - 18.40

O. Gamperling, M. Hrad, M. Huber-Humer (AT)

Lessons learned during a three-year full-scale application of in-situ landfill aeration in Austria

18.40 - 19.00

R. Cossu, R. Raga, G. Testolin (IT)

Landfill aeration experience in Italy

19.00 - 19.20

G. Öncü, M. Reiser, M. Kranert (DE)

Aerobic in-situ stabilization of landfill Konstanz Dorfweiher - Leachate quality after one year of operation

19.20 - 19.40 Discussion

SESSION C13

15.30-17.10

Management of medical waste

J. Richardson, B. Jenkin, A. Nichols, S. Pahl, G. Wallace (GB)

The role of behaviour change in reducing, reusing and recycling waste in healthcare: a systematic review and thematic analysis

D. Peresin, R. Finkler, N.L. Stedile, V.E. Schneider (BR)

Management of medical waste in a higher education institution: relationship between knowledge and the degree of segregation

R. Lacroce, D. Napoli (IT)

Innovative strategies for the disposal of hazardous infectious health care waste

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION C14

18.00-19.40

Contaminated soils related to waste management

D. Caniani, D.S. Lioi, I.M. Mancini, S. Masi (IT)

Assessment of soil pollution hazard by using fuzzy neural network

S. Suzuki, A. Tachifuji, Y. Matsufuji (JP)

Growth inhibition by soil components for degradation of dioxins using white rot fungus

R. Granata, D. Vanni, V. Specchio, M. Croce (IT)

Innovation in drilling and grouting for the rehabilitation of contaminated areas. Manfredonia landfills - Case history

G. Andreottola, I.A. Istrate, A. Badea, E.C. Rada, M. Ragazzi (IT)

The application of DCT technologies at laboratory scale

SESSION D13

15.30-17.10

Methane oxidation in landfill covers: methods & approaches

J. Gebert, C. Streblow, C. Knoblauch, E.M. Pfeiffer (DE)

Effect of gas transport on fractionation of carbon stable isotopes related to the microbial oxidation of methane in landfill cover soils

J. Streese-Kleeberg, R. Stegmann (DE)

Measurement of methane oxidation rates with gas push-pull tests (GPPT) - Applications and implications

W.J. Lu, Z.S. Mou (DK)

Effect of bio-cover equipped with a novel passive air diffusion system on methane emission reduction from landfill

D. Widory, M. Blessing, E. Proust, G. Bellenfant, O. Bour (FR)

Assessing methane oxidation under landfill covers and its contribution to the above atmospheric CO₂ levels: the added value of the isotope ($\delta^{13}\text{C}$ & $\delta^{18}\text{O}$ CO₂; $\delta^{13}\text{C}$ & δ^{D} CH₄)

M. Hrad, M. Huber-Humer, A. Watzinger, B. Wimmer (AT)

Design of top covers supporting aerobic in-situ stabilisation of old landfills - An experimental simulation in lysimeters

G. Rettenberger (DE)

Experiences with full-scale methane oxidation layers

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION D14

18.00-19.40

Case studies on landfill gas emissions

H. Rosqvist, J. Gebert, C. Streblow, S. Johansson (SE)

Spatial and temporal variability of gas migration at the surface of a MSW landfill

F.J. Maciel, J.F.T. Jucá (BR)

Landfill gas generation and emission in a MSW large-scale experimental cell in Brazil

M.N. Tanchuling, T. Soe, A. Resurreccion (PH)

Waste composition and surficial methane concentration at the Quezon City controlled dumping facility (QCCDF), Philippines

J. Law, E. Peterson, M. Hudgins (US)

Water requirements estimates for an aerobic bioreactor landfill in China

SESSION E13

15.30-17.10

Incineration of waste (II)

T.D.T. Nguyen, T.H.G. Nguyen, S. Schulenbrug, B. Bilitewski (DE)
Potential of municipal solid waste in Hanoi for energy utilization - A case study

J. Reichelt, G. Pfrang-Stotz, B. Bergfeldt, H. Seifert, P. Knapp (DE)
Formation of deposits on the surfaces of superheaters and economizers of MSW incinerator plants

E.L.S.F. Soares, J.R. Almeida, C.F. Mahler, A.S. Schueler (BR)
Study of the gravimetric characterisation and heating value of urban solid waste in Rio de Janeiro, Brazil

A. Sigg, M. Waldner, R. Halter, B. Brosh, H.J. Gehrman (CH)
Energy from Waste - Clean, efficient, renewable

A. Mantovani, R. Artoni, L. Palmeri (IT)
Evaluation of the air quality impact of an incineration plant by means of the CALPUFF model. A sensitivity analysis based on what-if emission scenarios

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION E14

18.00-19.40

Composting & compost quality

D. Meyer, G. Hädrich, W. Bidlingmaier, E. Kraft (DE)
The value of composting in the context of economy, ecology and legislation

Y. Decelle, J.L. Martel (BE)
Compost quality assessment and end of waste process: result of two ring tests performed in 2009 and 2011

T.L. Gladding (GB)
Dust and bioaerosol emission from open windrow composting sites: an examination of data trends



SESSION F13

15.30-17.10

Workshop:

Tannery waste management

Introductory lecture:

E.J.B.N. Cardoso, A.S. Nakatani, A.M. Martines (BR)

Recycling of tannery sludge in tropical soil - A case study in Brazil

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION F14

18.00-19.40

Workshop:

Material recovery from mixed municipal solid waste

Introductory lectures:

N. Schmalbein, T. Pretz, (DE)

Economic aspects of the resource recovery from mixed municipal solid waste

B. Wens, T. Pretz, R. Gillner (DE)

Recovery of non-ferrous metals from mixed MSW - comparable mechanical-biological waste treatment and waste incineration

H. Woelders, E. Michels, B. Nauts, M. Oosting (NL)

Integrated material and energy recycling plant Attero (NL)

D. Tonini, M. Wood, T. Astrup (DK)

Materials and carbon flow in a waste refinery process using enzymes



SESSION G13

15.30-17.10

Workshop:

Service lifetime of landfill barriers

Introductory lecture:

C. Pons, F. Farcas, E. Richaud, B. Fayolle, T. Bouchez, L. Mazeas (FR)
Methodology to determine the service lifetime of HDPE geomembranes used in basal liner systems municipal solid waste landfills

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSION G14

18.00-19.40

Workshop:

Monitoring of MBT landfills

Introductory lecture:

K. Münnich, J. Bauer, K. Fricke (DE)
Monitoring of MBT material after disposal in landfill



SESSIONE I13 (*in Italiano*)

15.30-17.10

**Nuovo ruolo della discarica e vecchie responsabilità:
“giustizialismo” o giustizia specializzata?**

F. Peres (IT)

Numerosità e complessità delle cause ambientali connesse alla realizzazione ed esercizio delle discariche controllate

17.10 - 17.40 Coffee Break

17.40 - 18.00 Poster discussion

SESSIONE I14 (*in Italiano*)

18.00-19.40

Coinvolgimento e opinione pubblica: opportunità o escamotage?

A. Atzori (IT)

Sistemi informatici 2.0 e flussi di informazione e conoscenza.
Il sistema ambiente come parte del sistema sociale

*M. Ragazzi, A. Castagna, M. Casagrande, A. Zeni, E. Girelli,
E.C. Rada (IT)*

Comportamento dei cittadini e produzione rifiuti

P. Simone, L. Nettuno, C. Zaninelli, M. Vercesi (IT)

Progettazione partecipata dei bambini sull'area della discarica
Vergomasco a Odolo, in provincia di Brescia



SESSION A15 - *Central Hall*

Pyrolysis & gasification (I)

09.00 - 09.20

V. Hankalin, V. Helanti, J. Isaksson (FI)

High-efficiency power production by waste gasification

09.20 - 09.40

U. Arena (IT)

A critical assessment of municipal solid waste gasification

09.40 - 10.00

M. Seggiani, A. Bellini, M. Puccini, G. Raggio, S. Vitolo (IT)

Cogasification of sewage sludge in an updraft gasifier

10.00 - 10.20

S. Morrin, P. Lettieri, C. Chapman, L. Mazzei (GB)

Assessment of a fluid bed gasification - Plasma converter process for clean and efficient conversion from solid waste

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION A16 - *Central Hall*

Combustion residues

11.10 - 11.30

D. Sager, S. Heuss-Aßbichler (AT)

Weathering of MSW bottom ash - results from field-scale experiments considering effects of saline solutions and internal structure

11.30 - 11.50

R. Melotti, E. Santagata, M. Bassani, M. Salvo, S. Rizzo (IT)

Characterization of ash from biomass combustion for its use as filler in asphalt mixtures

11.50 - 12.10

G. Cappai, A. Carucci, A. Muntoni, M. Piredda (IT)

Stabilization of APC residues by combined carbonation and washing treatment

12.10 - 12.30

T. Bramryd, M. Johansson (SE)

Utilization of incinerator slag during road construction and for remediation of landfill areas – heavy metal uptake in plant material as a potential limiting factor

12.30 - 12.50 Discussion

SESSION B15 - *Panorama Hall*

Landfill aftercare

09.00 - 09.20

A. Åkerman, O. Bour, M. Crest, E. Senante, J.M. Audic, D. Presse (FR)

Performing and cost-effective landfill gas management in the aftercare period

09.20 - 09.40

G. Delbarba, S. Querci (IT)

Environmental recovery of a landfill. Returning land to the local community - Terenzano, Castrezzato (Brescia), Italy

09.40 - 10.00

W.J. Van Vossen, Q.J. Prent (NL)

Feasibility study on sustainable material and energy recovery from landfills in Europe

10.00 - 10.20

R.M. Rosendal, D.G. Antonellis, N.L. Verlee (DK)

Estimation of the aftercare period based on data from Danish landfill

10.20 - 10.40 Discussion

10.40 - 11.10 Coffee Break

SESSION B16 - *Panorama Hall*

GHG emissions from organic waste management

11.10 - 11.30

C. Scheutz, J.K. Andersen, A. Boldrin, T.H. Christensen (DK)

Quantification of greenhouse gases from home composting of organic household waste

11.30 - 11.50

H. Yoshida, M. Amato, J.K Park (DK)

A survey on household level organic waste management practice for improving accuracy of carbon accounting

11.50 - 12.10

C. Scheutz, J.K. Andersen, J. Samuelsson, P. Kjeldsen, T.H. Christensen (DK)

Quantification of greenhouse gases from three Danish composting facilities

12.10 - 12.30

F.C. Gross, M.A. Siebel, V.S. Rotter (DE)

Quantification of greenhouse gas emissions resulting from handling of organic waste

12.30 - 12.50 Discussion

SESSION C15

09.00-10.40

Anaerobic digestion: process optimization

F. Monlau, A. Barakat, E. Latrille, C. Dumas, J.P. Steyer, H. Carrere (FR)

Impact of chemical composition and structural features on methane potential of lignocellulosic substrates

H. Shahriari, M. Warith, M. Hamoda, K. Kennedy (CA)

Anaerobic digestion of organic fraction of MSW after pretreatment with high temperature microwave and hydrogen peroxide addition

A.M. Fredenslund, T.B. Christensen, T. Kjær, S. Danielsen, H.B. Møller, L.L. Kjær, K. Fafner (DK)

Utilization of cast seaweed and waste from pectin production for anaerobic digestion

F. Lu, L.M. Shao, M. Zhu, P.J. He (CN)

Accelerate the start-up of waste anaerobic digestion at low inoculation rate

A. Boulanger, E. Pinet, A.A. Mansour, M. Bouix, T. Bouchez (FR)

Effect of inoculum to substrate ratio on municipal solid waste methanization potential

A. Alvarado-Lassman, J.M. Méndez-Contreras, R. Alvarado-García, J.M. Hernández-Martínez, N.A. Vallejo-Cantú (MX)

Anaerobic digestion of the organic solid waste soluble fraction in biofilm reactors

10.40 - 11.10 Coffee Break

SESSION C16

11.10-12.50

Production of bio-fuels

E.M. Angelis, A.I. Vavouraki, M. Kornaros (GR)

Pretreatment of the organic fraction of municipal solid wastes (OFMSW) for biofuel production

L. Vidal, E. Jimenez, F. Relea, L.C. Carrillo, D. Salvatierra, V. Signes, C. Coll (ES)

Biofuel: development of a new, integrated waste treatment process to generate liquid biofuel as the final result

A.I. Vavouraki, M. Dareioti, M. Kornaros (GR)

An experimental ensilaging procedure and chemical pretreatment of Sweet Sorghum stalks for enhancing biofuels production

G. De Gioannis (IT)

Low-power sonification for enhancing food waste hydrolysis in view of hydrogen bioproduction

P. Hadžić, M. Kutin, S. Borozan (SR)

Small-scale production of biodiesel from waste vegetable oil - transformation of one waste to another?

B. Rahimian Zarif (IR)

A novel *Saccharomyces cerevisiae* strain for production of ethanol in the presence of furfural

SESSION D15

09.00-10.40

Processes in landfills

K. Pivnenko, E. Gidaracos (GR)

Impact of bioreactor landfill aeration on in situ nitrification/denitrification process

R. Raga, R. Cossu (IT)

Lab scale tests before in situ aerobic stabilization of an old landfill

B. Wimmer, M. Horacek, A. Watzinger, O. Gamperling, M. Hrad, M. Huber-Humer, T.G. Reichenauer (AT)

Stable isotopic signatures for characterizing the biological stability of landfilled municipal solid waste

S. Lee, M. Jadeja, B. Beatty, G. Jarvis (CA)

Analysis of preliminary results of a pilot study on aerobic landfill technology at Innisfil landfill, Ontario, Canada

W. Kattenberg, T. Heimovaara (NL)

Policy process of allowing research pilots for sustainable emission reduction at landfills in The Netherlands

A. Chusov, M. Fedorov, M. Adrianona, E. Negulyaeva (RU)

Investigation of municipal wastes biodegradation ways

10.40 - 11.10

Coffee Break

SESSION D16

11.10-12.50

Alternative landfill cover materials

E. Branvall, L. Andreas, R. Sjoblom, I. Travar, J. Kumpiene, A. Lagerkvist (SE)

Ageing of ashes in a landfill top cover

R. Al-Fares (KW)

Medical waste fly ash recycling as filler for landfill soil cover and/or liner

M. Aljaradin, T. Selim, K.M. Persson (SE)

Evaluation of the cover soil in Manfraaq landfill-Jordan using Hydrys-2D simulation

M.A. Capanema, A.R. Cabral, H. Cabana, D. Massé (CA)

Evaluating odour reduction emissions from an experimental landfill biocover

J.R. Almeida, R.L.S. Izzo, C.F. Mahler, E.L.S.F. Soares (BR)

The use of compost as an alternative landfill cover

SESSION E15

09.00-10.40

Management of special waste

G. Aydin, A.I. Arol, G. Cayci (TR)

Evaluation of pyritic tailings from a copper concentration plant for calcareous sodic soil reclamation

P.A.A. Silva, J.C.O. Matias, P.N.B. Reis (PT)

Recycling of footwear products during the manufacture process: case study

D. Guyonnet, C. Hocquard, F.W. Wellmer (FR)

Link between primary (extracted) and secondary (recycled) mineral resources

M. Choura, I. Djemal, T. Mnif, A. Bendraoua (TN)

Chemical fixation and solidification treatment of solid waste generated by a natural gas purification plant

M. Oliveira, L. Carvalho, M. Martins, E. Duarte (PT)

Assessing the performance of biodegradable mulch film under real field conditions: case study in muskmelon crop

10.40 - 11.10 Coffee Break

SESSION E16

11.10- 12.50

Specific waste management strategies

M.A. Pérez, I. Aracil, A. Fullana (ES)

Biodiesel production by transesterification of sludge in supercritical conditions

S. Mitchell, P. O'Dowd, A. Dimache, T. Roche (IE)

The issue of waste in European manufacturing SMEs

J. Zhang, P. Yue, Y. Qian, H. Yang, J.L. Chao, P. He (CN)

Treatment and management of rural household solid waste in the subtropical region of China

M. Azevedo, M. Cruz, T. Novaris (BR)

Forming public consortium for final solid waste disposal and treatment in Brazil

SESSION F15

09.00-10.40

IWWG Workshop:
Prevention of food waste

Introductory lecture:

F. Schneider (AT)

Prevention of food waste - Basic definitions

10.40 - 11.10 Coffee Break

SESSION F16

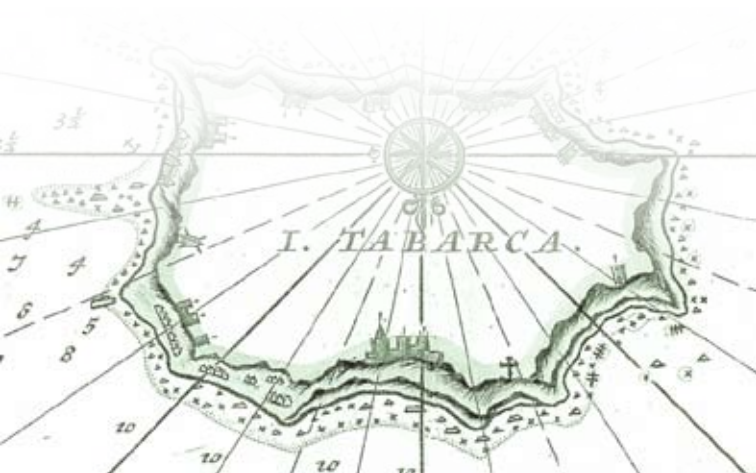
11.10-12.50

Workshop:
Asbestos waste treatment

Introductory lecture:

R. Moller Rosendal (DK)

Investigation of the potential health risk of collecting, transporting and handling asbestos waste



SESSION G15

09.00-10.40

Workshop:

Landfill gas extraction

Introductory lectures:

P. Novak, L. Kovar (CZ)

Diagnostics of landfill gas extraction system efficiency by instant sampling of methane emissions from landfill surface by Fulx-Fox technology

G. Di Bella, D. Di Trapani, M. Capodici, G. Viviani (IT)

The influence of landfill features and side slopes on methane emission rates

T. Pandolfi, R. Isolani (IT)

Determination of vacuum sphere of influence surrounding bio-gas extraction wells by a low expensive in situ methodology using a tracer gas

10.40 - 11.10 Coffee Break

SESSION G16

11.10-12.50

Workshop:

Citizen conflict & participation

Introductory lectures:

J. Mery, M. Matias, J.M. Deleuil, F. Olivier (FR)

Physical and human geography of the French landfill neighbourhoods

S. Harrington, I.D. Williams (GB)

Improving the efficiency and reducing the negative impacts of a civic amenity site in an area of high socio-economic deprivation: a case study

P. Simone, L. Nettuno, C. Zaninelli, M. Vercesi (IT)

Children-participate design on Vergomasco landfill of Odolo, Brescia Province

SESSIONE I15 (*in Italiano*)

09.00-10.40

Gestione dei rifiuti: tra incentivazioni e penalità

A. Moretto, A. Levorato (IT)

La regolazione e il controllo delle tariffe degli impianti di trattamento e smaltimento dei rifiuti: gli impianti in Veneto e in Italia

R. Cossu, S. Masi (IT)

La valutazione economica reale, al netto degli incentivi e delle penalizzazioni, della gestione dei rifiuti in Italia

10.40 - 11.10 Coffee Break

SESSIONE I16 (*in Italiano*)

11.10-12.50

Progettazione e costruzione delle discariche

R. Cossu, R. Stegmann (IT)

Differenti tipologie concettuali di discarica

R. Cossu (IT)

Aspetti innovativi nella progettazione e realizzazione delle discariche



POSTERS SESSION

Poster discussion will take place in the Poster Hall in the presence of authors, every afternoon from 17.40 to 18.00

A. Waste management

M. Ragazzi, E. Girelli, A. Castagna, M. Casagrande, A. Zeni, E.C. Rada (IT)

Citizen behavior and waste production

L. Benešová, M. Doležalová, A. Závodská (CZ)

Composition and characteristics of municipal solid waste (MSW) in Czech Republic

N.P. Thanh, Y. Matsui, D.T.T. Trang, N.T.K. Thai (VN)

GPS/GIS application for monitoring and managing segregate waste collection in Hanoi, Vietnam

G. Delbarba, S. Querci (IT)

Cogeme Gestioni and global selective waste collection. The success of a system three years after its introduction

H. Punkkinen, N. Teerioja, K. Moliis, E. Merta, J. Jermakka, E. Kuvaja (FI)

Sustainability of the pneumatic waste collection system in a dense urban area

T. Lolos, G. Tavoularis, C. Tsompanidis, G. Lolos (GR)

Development and evaluation of scenarios for integrated SWM systems in selected regions in Bulgaria

M. Luecke, A. Ismail, W. Gallala (TN)

Transferring local experience into regional knowledge - the new sector network in the MENA Region

G. Nardin, P. Simeoni, A. Mattiussi (IT)

Exhausted poultry beddings: from environmental issues to resources

B. Material recovery & recycling

A. Orsetti, M. Bergonzoni, G. Bodini, A. Bonoli (IT)

Reuse of PFU (tyres out of use) into the football fields of the new generation of synthetic turf

E.B.A.V. Pacheco, L.L.Y. Visconte, T.S. Gomes (BR)

The use of banana fiber residue as replacement of glass fiber in polymeric composites

J.C. Campos, V.C. Almeida, V.M.P. Couto, R.A. Rodrigues, F.V.F. Araujo (BR)

Incorporation of sludge from water treatment plant in cement paste

A. Białowiec, W. Janczukowicz, M. Krzemieniewski, Z. Guściatyn (PL)

The LECA from fly ash after sewage sludge treatment - Possibilities of reuse in constructed wetlands

M.L. Mancini, A. Bonoli, C. Chiavetta, M. Bergonzoni (IT)

Construction and demolition waste (CDW): recycling technologies and application of life cycle assessment (LCA) method in stabilized inert production

N. Quaranta, M. Caligaris, H. Lopez, M. Unsen, N. Lalla, G. Pelozo, A. Cristobal (AR)

Ceramic design to include several wastes from steel plants

G. Lovon-Canchumani, A. Magrini, M. Araujo (BR)

Lubricating oils: an analysis of the sector and recycling policies in Brazil

M. Martín-Morales, J. Cuenca, P. López, J. Rodríguez, M. Zamorano, I. Valverde-Palacios (ES)

Self-compacting concrete with biomass fly ash: preliminary results

P. Plescia, E. Tempesta, F. Trapasso, E. Barbarese, O. Cerri (IT)

Recycling of slags from steel industry and incineration for hydrogen production and CO₂ sequestration

G. Bodini, P. Merighi, M. Bergonzoni (IT)

Enhancement of rubber scrap for the production of innovative technological products: environmental and economic aspects

M. Dareioti, A.I. Vavouraki, M. Kornaros (GR)

Effect of pH on the anaerobic acidogenesis of agroindustrial wastewaters for maximizing bio-hydrogen production

C. Supporting tools in waste management

M.L. Mancini, A. Bonoli, C. Chiavetta, M. Bergonzoni (IT)

Life cycle application in industrial waste and end-of-life tyres use for thermo acoustic panels production

M. Alberti, D. Cantaboni, P. Cocca, M. Collotta, F. Marciano, D. Rossi, G. Tomasoni (IT)

The role of a pilot plant in the life cycle inventory of a new technology for the inertization of MSWI fly ashes

H.M.G. Coelho, L.C. Lange, M.R. Sartori (BR)

Waste management assessment using an industrial solid waste destination index

A. Del Borghi, C. Strazza, A. De Gasperi, A. Taramasso, M. Robba, P. Cinquetti (IT)

LCA and optimization - A combined decision tool for the assessment of the biowaste separate collection in the municipality of Cogoleto, Northern Italy

D. Biological treatment

Y.M. Kim, W.S. Choi, Y.C. Moon, J.Y. Kim (KR)

Predicting methane generation of paper using holocellulose and lignin content

F. Di Maria, A. Sordi, C. Micale (IT)

Experimental assessment of the energetic potential of the anaerobic co-treatment of different agricultural and agro industrial residuals and waste

Y.C. Moon, W.S. Choi, H.S. Cho, J.Y. Kim (KR)

Effect of hydraulic retention time and organic loading rate on anaerobic of food waste from garbage disposers

L. Lombardi, E. Carnevale, A. Corti, D. Bacchi (IT)

Potential evaluation and technology comparison for anaerobic digestion of organic fraction of MSW

A. Giordano, S. Grilli, A. Spagni (IT)

Effect of water content on biogas production of biodried MSW fine fraction

A. Schüch, F. Höfs, B. Lüdecke, M. Nelles (DE)

Native-organic fractions of municipal solid waste streams in rural areas - Energetic potentialities by anaerobic digestion

M.L. Mancini, A. Bonoli, M. Bergonzoni (IT)

Air biofiltering systems design and management for mitigation of olfactory impact from solid waste composting and pre-selection plants

Y. Yamashita, K. Iwata, K. Ohmiya (JP)

Dairy cow slurry management by screw press: composting solid component and aerobic digestion of liquid component

T. Lolos, I. Georgiou, G. Lolos, C. Tsompanidis (GR)

Environmental monitoring program results from the MBT plant located in the integrated solid waste management center of Ano Liossia Municipality in Western Attica

L.C Lange, F.V.B. Silva, G.F Simões (BR)

Influence of moisture content on anaerobic biodegradation of municipal solid waste in experimental reactors

G. Di Bella, A. Cosenza, P.A. Lanza, S. Nicosia, M. Torregrossa, G. Viviani (IT)

Biological stability analysis of the MSW matrix treated in a composting plant

A. Spagni, A.L. D'errico, S. Casu, S. D'acurso (IT)

Biological hydrogen production from cheese whey in a bench-scale upflow anaerobic sludge blanket

L. Alibardi, L. Favaro, M.C. Lavagnolo, R. Raga, M. Basaglia, S. Casella, R. Cossu (IT)

Does inoculum really affect bio-hydrogen production from OFMSW?

L. Favaro, L. Alibardi, M.C. Lavagnolo, M. Basaglia, R. Cossu, S. Casella (IT)

Looking for robust and efficient H₂-producing microbes

J.M. Mendez-Contreras, J.E. Ruiz-Espinoza, A. Alvarado-Lasman, S.A. Martinez-Delgadillo (MX)

Rheological kinetics parameters during the anaerobic co-digestion of wastewater sludge of MSW

D. Davolos, B. Pietrangeli (IT)

Investigating cultivable and uncultivable airborne microfungi from waste treatment plants

W.P. Clarke, A. D'Agostino, R. Cossu (IT)

Overcoming ammonia inhibition in the leach bed digestion of a chicken litter and organic waste blend

E. Mechanical and thermal treatment

A. Gianoncelli, F. Marciano, A. Zacco, R. Ardesi, G. Rizzo, E. Bontempi, L.E. Depero (IT)

Applicability of a new method for municipal solid waste incinerator (MSWI) fly ash inertisation: first mechanical test

A. Ilyas, H. Modin, K.M. Persson, M. Persson (SE)

Quality and biodegradation of residual organic matter in relation to management in MSWI bottom ash

M. Seggiani, A. Bellini, M. Puccini, S. Vitolo (IT)

Updraft fixed-bed gasification of sewage sludge: mathematical modelling and comparison with experimental data

K. Pstrowska, J. Walendziewski, M. Stolarski (PL)

Pyrolysis of rapeseed waste as a potential source of fuel component

L. Zhao, D. Chen, Z. Wang, X. Ma, G. Zhou (CN)

Pyrolysis of waste plastics and whole combustible components separated from municipal solid wastes: comparison of products and emissions

R. Ciccu, A. Mazzella, C. Tilocca, G. Mei (IT)

CO₂ uptake capacity and metal release capacity of carbonated sulcis coal ash

G. Cappai, A. Mazzella, S. Milia, M. Piredda (IT)

Evaluation of the carbon dioxide sequestration potential of several industrial residues

F. Landfills

P. Simone, A. Bracci, L. Nettuno, (IT)

Bioreactor: state of the art and development in Italy

A. Dall'Ara, L. Billi, M. Cauditelli, N. Faustini, G. Pescheta (BR)

Methodology to assess the production of low emissivity stabilized organic fraction in landfills

M. Fischetti, C. Cotto, F. Fracaro, F. Chiampo, A. Godio, B. Ruggeri (IT)

Full-scale use of liquid injection, for innovative control of waste moisture to enhance biogas production in pre treated waste landfill (Bio.Lea.R)

G.F. Simões, F.H.R. Silva (BR)

Application of linear and non-linear elastic models to predict settlements during the filling of a cell in Belo Horizonte sanitary landfill, Brazil

V. Lebrun, F. Delloye, E. Bietlot, O. Le Bussy, C. Collart (BE)
Landfill of waste in Wallonia: transposition of 1999/31/EC
groundwater protection plan and trigger levels based on long
term monitoring results

V. Lovincic, M. Sojic, A. Stanic, M. Tomasevic (HR)
Progress in the construction and rehabilitation of landfills in
the Republic of Croatia for the period 2003 - 2011

N. Nishida, T. Furuichi, K. Ishii (JP)
Evaluation for effectiveness of groundwater remediation in an
illegal dumping site

G.F Simões, H.M.G. Coelho, L.C. Lange (BR)
Study of heavy metals contamination on a municipal solid wa-
ste landfill site in Brazil

T. Wada, T. Furuichi, K. Ishii (JP)
Proposal of an estimation method of the distribution of the
waste layer and contaminated groundwater using an electrical
resistivity survey for remediation of illegal dumping sites

*E. Imre, T. Firgi, K. Rajkai, G. Telekes, G. Mile, J. MÓdos, I.
Subert (HU)*
Laboratory and in situ tests of a landfill

S. Masi, C. Schiavone, I.M. Mancini (IT)
The analysis and motion recovery for undifferentiated waste
disposed of in landfill

M. Karakouzian, D. Rigby (US)
A methodology for predicting long-term subsidence at landfil-
ls in an arid climate

G. Landfill gas and leachate

K. Ishii, T. Furuichi, H. Kamio (JP)

Estimation of change in methane generation rate by analysis of age-defined wastes in a landfill site

K. Starr, X. Gabarrell Durany, G. Villalba Mendez, L. Talens Peiró, L. Lombardi (IT)

CO₂ balance of biogas upgrading technologies

L. Lombardi, E. Carnevale (IT)

Energy recovery from biogas: internal combustion engines coupled with organic rankine cycle

L. Lombardi, R. Baciocchi, E. Carnevale, A. Corti, G. Costa, X. Gabarrell, P. Mostbauer, F. Olivieri, T. Olivieri, A. Paradisi, K. Starr, G. Villalba, D. Zingaretti (IT)

Innovative processes for biogas up-grading

T. Filep, E. Imre (HU)

An alternative way to utilization of landfill gas: production of methanol

S. Bohn, J. Begert, J. Jager (DE)

The effect of vegetation on the microbial methane oxidation

I. Pecorini, A. Corti (IT)

Efficiency of different types of landfill covers and comparison of CH₄ emission monitoring campaigns

K.K Kleeberg, J. Streese-Kleeberg (DE)

Optimisation of the needle trap-technique for gaschromatographic analysis of odorous emission

J.C. Campos, F.V.F. Araujo, L. Yokoyama, I.S. Cabral, L.A.C. Teixeira (BR)

Solar photo-Fenton process in the treatment of landfill leachate

P. Valenzuela, J.H. Palma, R. Espinace, R. Bernstein, P. Rivas, M. Mejias (CL)

Eco-technology for effluent purification from leaching liquid treatment plants

J.C. Campos, B. Quintaes, C.A.M.C. Silva, M. Hinojosa, K.R.A. Silva, M.A.L. Miguel, U.A. Silva, J.A. Ferreira (BR)

Microbial communities in the leachate from urban solid waste and hospital waste codisposed in experimental landfill

V. Ribé, E. Nehrenheim, M. Odlare, R. Berglind, Å. Forsberg (SE)
 Evaluation of the performance and safety of a pine bark filter for landfill leachate and storm water treatment: toxicity testing and chemical analysis

H. Special waste

J. Richardson, A. Nichols, M. Bennallick, J. Grose, S. Pahl (GB)
How can behaviour change theory contribute to a reduce, re-use and recycle approach to waste management in the NHS: a feasibility study

J. Richardson, T. Henry, A. Nichols (GB)
Assessing the co-benefits of a community initiative to reduce, re-use, recycle using a health impact assessment approach

G. Kochetov, S. Heuss-Aßbichler (UA)
Integrated treatment of Cooper-containing liquid waste

M.L. Mancini, M. Bergonzoni, C. Cordero, E. Maestri (IT)
Correlation between chemical and olfactometric aspects in treatment plants for dangerous special waste

D. Karatza, A. Lancia, G. Mazziotti Di Celso, D. Musmarra, M. Prisciandaro (IT)
Pilot scale application of mercuric chloride adsorption onto Darco FGD activated carbon

D. Musmarra, D. Karatza, M. Prisciandaro, R. Chirone, A. Lancia (IT)
Metallic mercury adsorption onto Darco FGD activated carbon on a pilot scale plant

N. Quaranta, M. Caligaris, H. Lopez, M. Unsen, N. Lalla, G. Pelozo, A. Cristobal (AR)
Environmental aptitude analysis of residues from metalurgical industries for their reutilization in diverse uses

B. Ruffino, D. Dalmazzo, E. Santagata, M.C. Zanetti (IT)
Preliminary evaluation of the potential use of paint sludge in bituminous binders

O. Ashihmina, E. Nehrenheim, M. Odlare, N. Hajem (SE)
Remediation of TNT using pine bark in a batch study: cometabolic reduction and sorption

T.V.N. Padmesh (MY)
Biosorption characteristics of *Portunus Sanguinolentus* particles for the removal of Acid Red 88 (AR88) and Acid Blue 15 (AB15) from aqueous solutions

A.B. De Farias, S.P. Fucale, R.A. Medeiros Junior, A.D. Gu-smão (BR)
Analysis of the use of civil construction waste (CCW) in soil improvement

D. Jacques, J. Šimůnek, D. Mallants, M.T. Van Genuchten, L. Yu (BE)

A coupled reactive transport model for contaminant leaching from cementitious waste matrices accounting for solid phase alterations

M. Oliveira, E. Duarte (PT)

An integrated approach of winery waste management

C. Barca, D. Meyer, C. Gérente, Y. Andrès, S. Troesch, F. Chazarenc (FR)

The use of steel slag as a substrate to treat wastewater: an integrated approach

G.A. Zainescu, P. Voicu, R. Constantinescu, M. Arsene, O. Vizitiu, M. Mihalache (RO)

Innovative process for obtaining biopolymers from leather wastes for agriculture

R. Ciccu, G. Mei, C. Tilocca, M. Figus (IT)

Reuse of products from waste anodes of aluminium smelter

F. Moedinger, F. Ast, M. Ragazzi, E.C. Rada, C. Campostrini, S. Ciuta, A. Badea, G. Ionescu (IT)

Exhausted grape marc bio-drying: a pilot scale experimentation

K. Shih, Y. Tang, C. Liao (CN)

How hazardous metals are stabilized through the thermal reaction with clay materials?



I. Contaminated soils

M.L. Mancini, M. Bergonzoni, A. Zanini (IT)

Groundwater numerical models as tool for managing polluted sites: a test case

F. Pellerà, E. Gidarakos (GR)

Immobilization of heavy metals in soil using olive pomace biochar

P. P. Falciglia, S. Cannata, S. Romano, F.G.A. Vagliasindi (IT)

Remediation of radionuclides polluted soil by stabilisation/solidification

S.J. Ban, K.K. Lee, H.S. Cho, J.Y. Kim (KR)

Phytoremediation of Cd and Pb contaminated soil around closed open dumping landfill

M.F. Milazzo, R. Lisi, V. Bartolozzi (IT)

Environmental human health risk analysis as a tool for remediation of contaminated sites

S. Testa (IT)

Reclamation of a polluted site within an urban center and concurrent management of a cement asbestos landfill: a best practice

A. Takahashi, T. Kameyama, Y. Suzuki, M. Nakamura, Y. Otsuka, Y. Katayama (JP)

Bio-degradation System for Poly-chlorinated Dibenzo-p-dioxins and Dibenzofurans by Using Crude Enzyme Extracted from *Geobacillus* sp. UZO3



USEFUL INFORMATION

Official Languages

The working language of the Symposium is English. This year, for the second time running, a session will be held entirely in Italian to facilitate participation by local experts and administrators.

Entrance fee

Conference

The registration fees are as follows:

	<i>Non-IWWG Member</i>	<i>IWWG Member</i>
Participant Regular Fee	€ 1.200,00 + VAT 20%	€ 1.100,00 + VAT 20%
Participant Early Bird <i>by August 15th</i>	€ 1.100,00 + VAT 20%	
Student	€ 750,00 + VAT 20%	€ 700,00 + VAT 20%

In accordance with Italian law **all participants**, irrespective of their country of origin, **are required to pay 20% VAT on entrance fee.**

IWWG members are entitled to a 100 € discount on regular fees. IWWG membership costs 200 € (130 € for students - VAT free) and affords numerous benefits, including yearly subscription to the international scientific journal “Waste Management”, published by Elsevier as official journal of IWWG. IWWG membership information is available on the websites: www.iwwg.eu and www.elsevier.com

Registration fees include:

- Participation in Symposium sessions
- Proceedings (book + CD) and conference materials
- Coffee breaks
- Gala Dinner (supplement to evening meal)

Training Courses

The registration fees are as follows:

	<i>Non-IWWG Member</i>	<i>IWWG Member (-25%)</i>
1 Course	€ 60,00 + VAT 20%	€ 45,00 + VAT 20%
2 Courses	€ 100,00 + VAT 20%	€ 75,00 + VAT 20%
3 Courses	€ 120,00 + VAT 20%	€ 90,00 + VAT 20%

Certificates of completion will be distributed on request at the conclusion of classes.

To register for the training courses please download a registration form from the Symposium website:

www.sardiniasymposium.it

Payments

The enclosed application form, also downloadable from the Symposium website, should be filled in and returned to Eurowaste srl. Registration will be considered effective only after receipt of the respective fee.

Eurowaste srl will reimburse participant registration fees already paid if written request of cancellation is submitted. Reimbursement will be as follows:

80% before 31 August 2011

50% before 20 September 2011

No refund will be possible after this date.

All fees should be paid by bank transfer made out to:

Eurowaste srl

Account: 641969, CAB: 12120, ABI: 02008,

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Unicredit Bank, Piazza Cavour, Padova, Italy

Or by online credit card payment on:

www.sardiniasymposium.it

Please send proof of payment to Eurowaste by email to

info@sardiniasymposium.it or by fax to +39.049.8726987

Registration

The Registration desk will be open in the Conference Center Hall on Sunday October 2nd 2011, from 16.00 - 19.00, Monday October 3rd 2011, from 08.00 - 13.00 and from 14.30 - 15.30. Late registration can be carried out on Tuesday, October 4th 2011, from 09.00 - 10.00.

Company Exhibition

A small commercial exhibition will be held during the conference where organisations and companies can display technical literature and associated material. For further information please contact:

Cinzia MAMBERTI

Eurowaste srl

Via Beato Pellegrino, 23 - 35137 - Padova, Italy

Tel. +39.049.8726986 - Fax +39.049.8726987

Email: eurowaste@tin.it

Official Travel Agent

All delegates and authors are expected to make their own travel and hotel arrangements.

The Official Travel Agency is available for assistance:

F.A. Travel Srl

Via S. Tommaso d'Aquino 18,

09134 – Cagliari, Italy

Tel: +39.070.554195

Fax: +39.070.513451

Email: landfill@fatravel.it

Transport

Cagliari is linked to the main Italian cities by daily flights.

The airport of Elmas (Cagliari) is located about 40 km from the Forte Village Resort and 7 km from Cagliari city centre. Participants are advised to fly to Cagliari airport, even though Cagliari can be reached by Ferry-Boat (Civitavecchia-Rome, Genova, Palermo, Napoli).

A special transfer service from Elmas airport to Forte Village Resort will be available on Saturday October 1st (afternoon), Sunday October 2nd and Monday October 3rd, and from Forte Village to Elmas airport on Friday October 7th (afternoon) and Saturday October 8th. Specific departure times will be scheduled at a later date.

On **Sunday October 9th** a bus transfer service will be arranged in the early morning and in the afternoon.

Transfer fees:

One way ticket € 31,00

Return ticket € 62,00

Individual transfers during the symposium week will be provided at the following rates:

Vehicle (from 1 to 3 people) € 92,00

Minibus (from 4 to 8 people) € 125,00

The total amount for transfers must be paid advance together with hotel booking.

HOTEL FACILITIES

The Hotel Complex

The Forte Village Resort is located about 40 Km from Cagliari, the capital of the island, and 8 km from S. Margherita di Pula. It is set in a natural park of 25 ha, of which at least half is given over to gardens and pinewoods. The Forte Village Resort (which includes Hotel Castello, Hotel Pineta, Hotel il Villaggio, Hotel il Borgo, Hotel le Palme, Hotel Dune, and Hotel Villa del Parco) comprises approx 600 cottages. Each cottage consists of a twin bedroom, private bathroom with shower, direct dial telephone and TV, air conditioning and private patio.

The Hotel Castello, Hotel Pineta and Hotel Villa del Parco are set in a secluded part of the Village grounds, surrounded by tall pine trees. Hotel Le Dune includes 34 extra luxury cottages near the sea.

Accommodation

A block booking with special rates has been made at Forte Village Resort to accommodate all participants.

Prices on a halfboard basis are as follows:

Il Villaggio / Le Palme	€ 112,00
single supplement	€ 30,00
La Pineta / Il Borgo	€ 120,00
single supplement	€ 30,00
Hotel Castello	€ 133,00
single supplement	€ 30,00
Hotel Le Dune	€ 240,00
single supplement	€ 60,00
Villa del Parco	€ 245,00
single supplement	€ 60,00
Castello Deluxe	€ 275,00
single supplement	€ 60,00

Single rooms are double rooms with a single occupant.

All prices quoted are per person per day. On a halfboard basis, meals included are breakfast and evening dinner.

For the evening of the Gala dinner, the Organizers will be pleased to cover the necessary supplement to the price paid for evening dinner. Accompanying persons wishing to attend the Gala dinner should book at the Conferente Secretariat; in this case the supplement will be payable directly to Forte Village Resort. Reservations should be mailed directly to our Official Travel Agency, F.A. Travel Srl by filling in the reservation form downloadable from the Symposium website.

Hotel facilities

Hotel booking will be confirmed only after receipt of a deposit (indicated on the form) calculated on total accommodation cost as follows:

- € 300,00 per person for a stay of 5 nights or more;
- 75% per person for a stay of 4 nights or less.

Deposits should be sent to F.A. Travel by bank transfer or credit card payment. For further details, please contact F.A. Travel.

We regret that it will not be possible to modify the type of accommodation once booking has been confirmed.

Booking received after the deadline of 10th September 2011 cannot be guaranteed. No refund will be possible for advance departure respect to number of nights paid.

Reductions

Reduction for children (only if sharing with 2 adults):

- children 0-12 years, FREE;
- third bed, 50%

Cancellations

Please inform F.A. Travel of any change or cancellation of hotel reservation. Deposit may only be refunded if notification of cancellation is received before **10th September 2011**.

Sport & Entertainment

For recreation there is a superb stretch of private beach, 11 floodlit tennis courts, five swimming pools, a sauna and gymnasium, horse riding, basketball, volleyball, table tennis, mini golf, trampolines and much more. The Water Sports Centre offers wind surfing, sailing, scuba diving, water-skiing, rowing boats, catamaran and paragliding (at extra cost). Disco dancing until the small hours in the modern Forte Resort Discotheque.

The "Terme del Parco" health centre

We heartily recommend a visit to the marvellous Terme del Parco health centre. Here you can relax in a secluded oasis dotted with heated swimming pools with artificial waterfalls, hydromassage and wave-makers. Moreover you may work-out in a fully-equipped gym or regain top form in a sauna, Turkish bath or in the beauty centre and massage rooms. Special cost for Sardinia 2011 delegates: 65 Euros

Meal functions

All Delegates residing at Forte Village Resort are accommodated on a half-board basis (breakfast and evening dinner included). Delegates resident at Forte Village Resort, who wish to obtain a buffet lunch in the hotel restaurants may do so but will be required to pay an extra 31,00 Euros per person per day. For delegates not resident at Forte Village Resort, the extra cost is 38,00 Euros per person per day. For those who do not wish to consume a full lunch, several snack bars and the pizzeria will be open in the hotel complex.

SOCIAL EVENTS

Social events play an important role in the success of the Sardinia Symposia. In view of the fact that the Scientific Programme is particularly intense and the Symposium lasts for five days, it is important to relax during session breaks and in the evening.

Here is just a taste of what to expect during the Symposium:

Tuesday 4th	Sardinian Dinner
Wednesday 5th	International Soccer Match
Thursday 6th	Sardinia's Got Talent
Friday 7th	Gala Dinner and Closure of Symposium

During the Gala dinner Awards will be given for the best papers in different areas. As for the past editions the Sardinia Symposium Award "A Life for Waste" will be presented in order to congratulate an outstanding personality in the field of Waste Management. The Award winner will be indicated by a Jury of International Experts.

SARDINIA SYMPOSIUM AWARD

"A Life for Waste"

In 1999, the International Advisory Board for the Sardinia Symposium set up an award "A Life for Waste", to be presented biennially to individuals who have made an outstanding contribution to advances in international waste management.

Hall of Honour "A Life for Waste"

- 1999 - Masataka HANASHIMA
- 2001 - Eugenio DE FRAJA FRANGIPANE
- 2003 - Robert HAM
- 2005 - John PACEY
- 2007 - Grahame FARQUHAR
- 2009 - Rainer STEGMANN

CONTENTS

Supporting bodies	pag. 1
Presentation	pag. 2
International Advisory Board	pag. 3-4
Organising Committee and Secretariat	pag. 4-5
Daily Programme	pag. 6-72
Sunday	pag. 6
Monday	pag. 7-15
Tuesday	pag. 16-31
Wednesday	pag. 32-47
Thursday	pag. 48-63
Friday	pag. 64-72
Posters session	pag. 74-83
Information	pag. 84-86
Hotel facilities	pag. 87-88
Social events	pag. 89

SARDINIA 2011

Thirteenth International Waste Management and Landfill Symposium

3-7 October 2011

S. Margherita di Pula (Cagliari), Sardinia, Italy

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VAT n. (obligatory)

Entrance Fee

• Conference

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IWWG Member

Participant € 1.200,00 + VAT 20% € 1.100,00 + VAT 20%
Regular Fee

Participant € 1.100,00 + VAT 20%
Early Bird
by August 10th

Student € 750,00 + VAT 20% € 700,00 + VAT 20%

• Training Courses (in addition to the Conference fee)

Non-IWWG Member

IWWG Member (-25%)

1 Course € 60,00 + VAT 20% € 45,00 + VAT 20%

2 Courses € 100,00 + VAT 20% € 75,00 + VAT 20%

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