


São Paulo – Brazil – May, 18–20, 2011



**3<sup>rd</sup>**  
INTERNATIONAL WORKSHOP  
ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD”

organized by

	Programa de Pós-Graduação em Engenharia de Produção Mestrado e Doutorado
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In participation with



## Conference Report

Responsible for the information:

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(Conference Chair)

<http://www.advancesincleanerproduction.net>

**Abstract**

During the 3rd International Workshop Advances in Cleaner Production, Brazilian and foreign researchers discussed for three days at the University Paulista (Indianópolis Campus) the topic of the conference: Cleaner Production Initiatives and Challenges for a Sustainable World.

The international conference was organized by the Postgraduate Program in Production Engineering (Master's and Doctoral Program) and counted with the partnership of the NPPR (National Prevention Pollution Roundtable, from United States), UCF (Universidad Cienfuegos, Cuba), and UNISON (Universidad de Sonora, México).

The partnership with the Journal of Cleaner Production, that was started during the 1st Workshop was maintained with the support of the Editor in Chief (Prof. Donald Huisingh), and resulted, as occurred at the other two previous conferences, in the Call for Papers for a special issue of the journal to be published with the best works presented in this third edition.

The 3rd Workshop received financial support from the funding agencies FAPESP (Fundação do Amparo à Pesquisa do Estado de São Paulo) and CAPES (Coordination for the Improvement of Higher Education), which were fundamental to the achievement of the conference. Manole and Edgard Blücher Publishers, as well as Revista Meio Ambiente Industrial also participated and supported the event.

The conference also counted with the sponsorship of ABEPRO (Brazilian Association of Production Engineering), CETESB (Environmental Agency of São Paulo), UNEP (United Nations Environmental Program), UNIDO (United Nations Industrial Development Organization), Red Latinoamericana de Producción más Limpia., FIERGS/SENAI and FIESP (industry federations of the states of Rio Grande do Sul and São Paulo), LATEC (Laboratory Technology, Business Management, Jatobás Institute, Intertox, São Paulo Tourism, and Ministry of the Environment).

The Vice Dean for Post-Graduate Studies and Scientific Research of UNIP had the merit of the conference success, having been responsible for infrastructure support, as well as for providing teachers and students of the Tourism, Secretarial, Pedagogy and Marketing courses who were active members of the Supporting Committee. Also the UNIP Chorus performed a Brazilian repertoire.

The organizing Committee considered that all the pre-established goals proposed to be attained during the 3<sup>rd</sup> Workshop were fully reached:

**(1) The academic information exchange** goal was fully achieved. It was significant the number of participating academic institutions (82 universities and colleges), that reflected in the 144 academic contributions presented. The excellent quality of the contributions presented, in a process of continuous improvement as was seen edition by edition, resulted in another invitation by the Journal of Cleaner Production (JCP), for a third special issue.

**(2) Presentations of recent achievements in CP** were made by a significant number of companies. Thirty two (32) cases of success were presented in oral form. The conference promoted the transfer between academic knowledge and corporate experience and counted with the participation of 42 companies comprising industrial and services sectors.

**(3) The common problems and routing of solutions** was extensively and deeply discussed at plenary sessions, oral presentations, and workshops. Ten workshops were offered during the conference, where working groups were formed to discuss attitudes needed to contribute to the key elements for a sustainable world. These activities were coordinated by foreigner and national invited speakers.

The first one: "Envisioning and Making Plans to Implement Truly Sustainable Societies", was conducted by Dr. Donald Huisingh (University of Tennessee-USA), editor-in-chief of Journal of Cleaner Production. There, sixty three participants were invited to reflect on options towards future sustainability, and based on discussion, to elaborate a planning strategy to achieve the real sustainability of a society.

The second workshop, How to develop a Green Chemistry Roadmap and Alternatives Assessments, was conducted by Dr. Ken A. Zarker from Washington State Department of Ecology (USA). The twenty four (24) participants who attended the workshop discussed the evaluation of alternatives to produce chemicals within the green chemistry production concept.

Dr. Sergio Ulgiati from Parthenope University of Naples (Italy) offered the workshop titled "Multidimensional Assessment of Sustainability and Performance in the Agro-Industry". There, the twenty (20) participants discussed the necessity of the systemic approach and multicriteria assessment tools in order to evaluate agro-industrial systems in terms of sustainability.

The ecological Footprint was the topic of the fourth workshop, where thirty six participants (36) conducted by researchers from various Brazilian institutions, discussed the use and suitability of that

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"CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD"

São Paulo – Brazil – May 18<sup>th</sup>-20<sup>th</sup> - 2011

indicator to evaluate sustainability. The researchers were: Dr. Enrique Ortega (UNICAMP); Dr. Flavio Horneaux Junior (UNIP); and Dr. João S. Furtado (Jatobás Institute).

At the fifth workshop, Commander Gilberto Huet de Bacellar Sobrinho from the Brazilian Navy, discussed the National Submarine Development Programme in terms of its environmental management. The workshop counted with fifteen (15) participants, including Navy officers.

Brazilian researchers conducted the sixth workshop that was entitled: Management of Organizational Performance with Focus on Sustainable Development – The researchers were: Miguel Afonso Sellitto (University of Vale dos Sinos); Miriam Borchartt (University of Vale dos Sinos); Carla Gonçalves Machado (Pontifical Catholic University); Othon Fabrício Martins da Silva (State University of São Paulo). Twenty (20) participants debate on the organizational models to achieve the desired performance in order to contribute to sustainable development.

Industrial Ecology in Practice was the title of the workshop conducted by Dr. Leo Bäas from Linköping University (Sweden). The twenty four (24) participants worked on real cases of Industrial Ecology application.

Sustainable Farming was the topic debated at the workshop conducted by: Gloria C. Rótole (Instituto Nacional de Tecnología Agrícola – Argentina); Clara Rosalia Alvarez-Chavez (Sonora University– Mexico) and Irenilza Nääs (UNIP - Brasil). Eighteen (18) participants debated food production and the use of agriculture to energy production.

The ninth workshop - Tools for Sustainability – was conducted by André Coimbra Felix (Universidade Federal de São Carlos), Carlos A. Di Agustini (Fundação Getúlio Vargas) and João S. Furtado (Jatobás Institute). The twenty eight participants worked with sustainability assessment tools.

The tenth workshop, conducted by Marcus E. M. da Matta (Intertox Consultoria e Pesquisa) and Mirtes Veitas Boralli (Ministry of the Environment), debated Emissions Registration and Transfer of Pollutants. It counted with nineteen (19) participants.

**(4)** The increase in **international relationship** through individual and institutional contact was a goal achieved. Participants of 14 countries attended the conference.

**(5) The deepening of the discussion on the fundamental theme of the conference:** Cleaner Production Initiatives and Challenges for a Sustainable World was the concern of the conference.

Given these impressive results, the Organizing Committee is honored for having organized the 3rd International Workshop on Advances in Cleaner Production.

**Presentation**

The **3<sup>rd</sup> International Workshop: Advances in Cleaner Production** was carried out with the participation of a heterogeneous group of people committed to the success of the conference. This heterogeneous team consisted of guest speakers, lecturers, presenters of academic and organizational experiences and sessions' coordinators.

The institutions presented at the event through active participants are listed below. The list evidences the broad institutional representation at the conference.

- 3M do Brazil
- Agência Paulista de Tecnologia dos Agronegócios - APTA
- AGENDA 21 MACRO LESTE
- Alimaq Máquinas e Ferramentas Ltda
- Associação Brasileira de Engenharia de Produção (ABEPRO)
- Associação de Engenheiros da CETESB
- Axia Value Chain
- Baggio Bossi Consultores
- Beijing Normal University - China
- Cardiff University
- Catholic University of Leuven - Holland
- Centrais Elétricas do Norte do Brasil S/A - Eletronorte
- Centro das Indústrias do Estado de São Paulo (CIESP) - Brazil
- Centro de Desenvolvimento da Tecnologia Nuclear
- Centro de Educação Popular e Pesquisas Econômicas e Sociais - CETEPPES
- Centro de Tecnologia da Indústria Química e Têxtil - SENAI
- Centro de Tecnologia da Informação - CTI
- Centro Federal de Educação Tecnológica CEFET/RJ Unidade Descentralizada Niteroi
- Centro Paula Souza de Ensino Técnico
- Centro Universitário UNA
- Concremat Engenharia e Tecnologia
- Ecouniverso Projetos Ambientais
- Eletrobras Eletronuclear
- Energy and Process Engineering
- Erasmus University Rotterdam
- Escola de Engenharia de São Carlos-USP
- Escola Politécnica - USP
- Escola Superior de Agricultura Luiz de Queiróz
- Euro-Bangla Consulting Firm
- Eurofarma Laboratório LTDA
- Faculdade de Ciências Agrônomicas - UNESP
- Faculdade de Economia, Administração e Contabilidade -USP, Ribeirão Preto
- Faculdade de Engenharia Civil - UNICAMP
- Faculdade de Saúde Pública - USP
- Faculdade de Tecnologia SENAI
- Federação das Indústrias do Estado de Minas Gerais
- Federação das Indústrias do Estado de São Paulo
- Fersol Industria e Comercio LTDA
- Fundação de Apoio ao Ensino, Pesquisa e Extensão de Itajubá - FAPEPE
- Fundação Getúlio Vargas -EAESP
- Fundação Joaquim Nabuco - FUNDAJ
- Fundação Oswaldo Cruz
- Fundação Santo André
- Fundacentro/MTE
- Instituto Nacional de Tecnologia Agropecuária - INTA (Argentina)
- Instituto de Pesquisas Energéticas e Nucleares - IPEN-CNEN/SP
- Instituto de Pesquisas Tecnológicas - IPT
- Instituto de Tecnologia de Alimentos - ITAL
- Instituto Federal de Educação, Ciência e Tecnologia de Goiás - GOIAS
- Instituto Federal de Educação, Ciência e Tecnologia de São Paulo - IFSP
- Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte - IFRN
- Instituto Federal de Educação, Ciência e Tecnologia Sul de Minas Gerais - IFSULDEMINAS
- Jatobás Institute
- Instituto Superior Tupy - SOCIESC
- Intertox Consultoria e Pesquisa
- Italian Agency for New Technology, Energy and the Environment - ENEA
- Johnson & Johnson
- Journal of Cleaner Production - USA
- Laboratório de Aprendizagem em Logística e Transportes - LALT/UNICAMP
- Linköping University – Suécia
- Loughborough University - UK
- Brazilian Navy
- Mesa Redonda Paulista de Produção mais Limpa (MRPP+L)
- Ministry of the Environment
- Mod Line Soluções Corporativas Ltda.
- National Bioecological Architecture Association (ANAB)
- National Pollution Prevention Roundtable (NPPR) - USA
- ONU – Organização das Nações Unidas
- Parthenope University of Naples (UPN) - Itália
- Pertech do Brasil Ltda
- Pontifícia Universidade Católica de Goiás
- Pontifícia Universidade Católica de São Paulo
- Pontifícia Universidade Católica do Rio Grande do Sul
- Prefeitura Municipal de São Paulo (CMSP) Secretaria de Saude do Rio Grande do Sul
- Redimpex Armazens e Transportes
- Renner Sayerlack S/A
- Rostock University
- SABESP

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“CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD”

São Paulo – Brazil – May 18<sup>th</sup>-20<sup>th</sup> - 2011

- Serviço Nacional de Aprendizado Industrial/ SENAI
- Siemens do Brasil
- SL Consultoria
- Tenesse University (TU)
- Theraskin Farmacêutica LTDA
- Trópico Sistemas e Telecomunicações S.A
- Univerdad de Cienfuegos (UC) - Cuba
- Universidad de la República (UdelaR)
- Universidad De La Salle Bajío - México
- Universidad de Sonora (Unison) - Mexico
- Universidade Anhembi Morumbi
- Universidade Camilo Castelo Branco
- Universidade de Caxias do Sul – UCS
- Universidade de Mogi das Cruzes
- Universidade de Santa Cruz do Sul - UNISC
- Universidade de São Paulo
- Universidade de Trás-os-Montes e Alto Douro - UTAD
- Universidade do Vale dos Sinos
- Universidade Estácio de Sá
- Universidade Estadual de Campinas
- Universidade Estadual de Londrina
- Universidade Estadual de Maringá
- Universidade Estadual de Santa Catarina
- Universidade Estadual do Oeste do Paraná
- Universidade Estadual do Piauí
- Universidade Estadual Paulista
- Universidade Federal da Bahia
- Universidade Federal de Goiás
- Universidade Federal de Itajubá
- Universidade Federal de Pernambuco
- Universidade Federal de Santa Catarina
- Universidade Federal de São Carlos
- Universidade Federal do ABC
- Universidade Federal do Ceara
- Universidade Federal do Pampa
- Universidade Federal do Paraná
- Universidade Federal do Rio de Janeiro
- Universidade Federal do Rio Grande Norte
- Universidade Federal do Rio Grande Sul
- Universidade Federal do Sul de Santa Catarina (UNISUL)
- Universidade Federal Fluminense
- Universidade Federal Rural de Pernambuco
- Universidade Federal Santa Catarina
- Universidade Nacional de La Plata (UNLP) – Argentina
- Universidade Nove de Julho
- Universidade Paulista
- Universidade Tecnológica Federal do Paraná
- Vesalius College - Belgium
- Washington State Department of Ecology - USA

### Participants Profile

The **3<sup>rd</sup> International Workshop: Advances in Cleaner Production** had 526 participants from various sectors committed with the theme: Cleaner Production Initiatives and Challenges for a Sustainable World (Figure 1). Comparison with the earlier conferences shows a significant increase in the total number of participants. Worth of notice are the 105% increase in the participation of universities and colleges and the increase of approximately 23% in the number of undergraduate students. The number of participants from private companies was maintained but the total number of companies presented increased. In 2011 the conference counted with 42 private companies represented by 124 participants. In 2009, 24 companies attended the conference with 141 participants.

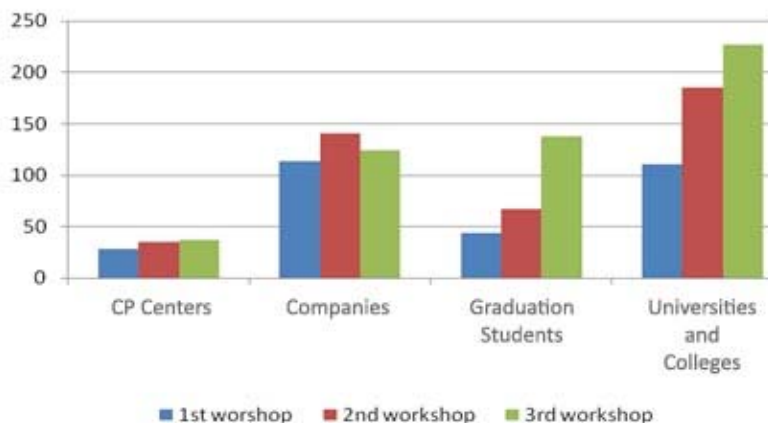


Figure 1. Participants of the 3<sup>rd</sup> International Workshop Profile compared to the profile of the previous conferences

In addition to the lectures presented by the eight foreign invited speakers, 144 academic works and 32 organizational experiences were presented. Among all these contributions, various regions of Brazil were

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“CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD”

São Paulo – Brazil – May 18<sup>th</sup>-20<sup>th</sup> - 2011

represented (Figure 2). All Southeastern states were represented at the conference, and this was the region with the highest number of representatives. It should be highlighted the participation of the Southern states and the Northeastern states, with participants of Bahia, Paraíba, Piauí, Rio Grande do Norte and Pernambuco. The participation of North and Central-West Regions also increased at this third edition of the conference. The comparison with previous data shows an increase of the participants from each Brazilian Region as well as of foreign participants. The comparison with data from the second conference shows that the participation of the southeastern states increased (64%), as well as northern states (83%) and central-western states which increased ten times. Participation of foreign universities increased 20 % in oral presentations.

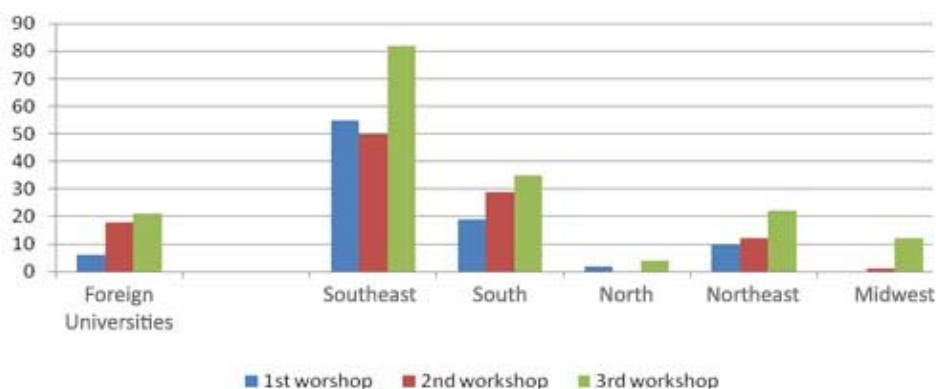


Figure 2. Number of participants who present works at the three conferences, organized according to geographical origin.

### Plenary Sessions

The eight invited speakers addressed important issues related to Cleaner Production advances and the theme of the conference. (Table 1).

Tabela 1 Invited speakers, topic addressed and speakers' institution.

Speaker	Topic addressed	Institution	Country
<b>Sergio Ulgiati</b>	Organic waste, residues and by-products from agricultural, industrial and urban systems as biorefinery substrates: Viable Option or Fairie Tale? An application of SUMMA (SUstainability Multi-method Multi-scale Assessment)	Parthenope University of Naples	Italy
<b>Ken Zarker</b>	Advancing chemicals policy in the United States to promote safer chemicals and products	Washington State Department of Ecology	USA
<b>Leo Bäas</b>	Cleaner Production and Industrial Ecology: Two Important Concepts for a Sustainable Industry	Linköping University-	Sweden
<b>Nora Elba Munguía Vega</b>	Sustainability practices performed at the Mexican Maquiladora Industry: A case study in the state of Sonora and Baja California, Mexico	Universidad de Sonora	México
<b>Donald Huisingh</b>	Five challenges we must address IF we are to make progress toward truly sustainable societies!	University of Tennessee	USA
<b>Peter Wells</b>	Diversity, Scale and Sustainability	Cardiff University	UK
<b>Mohamed Osmani</b>	Innovation in Cleaner Production through Concrete and Cement Composite Recycling	Loughborough University	UK
<b>Sergio Ponce</b>	Proyecto Piloto Implementación de la Metodología de Producción Más Limpia en la Universidad de la Salle Bajío Escuela de Turismo y ECEA	Universidad De La Salle Bajío	México

### Quality of work

The quality of the work presented resulted in a third invitation by the Journal of Cleaner Production, for a special issue of the journal containing papers related to the 3rd International Workshop: Advances in Cleaner

"CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD"

São Paulo – Brazil – May 18<sup>th</sup>-20<sup>th</sup> - 2011

Production. The call for papers may be accessed at the event website: ([www.advancesincleanerproduction.net](http://www.advancesincleanerproduction.net)).

### **Workshops**

In the Workshops, issues concerning the Cleaner Production Initiatives and Challenges for a Sustainable World were addressed and debated (Table 2). Two hundred and sixty seven participants (Figure 3), of the most diverse sectors were invited in the ten workshops to reflect on the following important issues.

Table 2. Workshops delivered at the conference.

<b>Workshop</b>	<b>Presenter</b>	<b>Nº of participants</b>
Envisioning and Making Plans to Implement Truly Sustainable Societies	Donald Huisingh	63
How to develop a Green Chemistry Roadmap and Alternatives Assessments	Ken A. Zarker	24
Multidimensional Assessment of Sustainability and Performance in the Agro-Industry	Sergio Ulgiati	20
Ecological Footprint	Enrique Ortega; Flavio Horneaux Junior and João S. Furtado	36
Submarine Development Programme / Shipyard and Naval Base	Gilberto Huet de Bacellar Sobrinho	15
Management of Organizational Performance with Focus on Sustainable Development	Miguel Afonso Sellitto; Miriam Borchardt; Carla Gonçalves Machado and Othon Fabrício Martins da Silva	20
Industrial Ecology in Practice	Leo Båas	24
Sustainable Farming	Gloria C. Rótolo; Clara Rosalia Alvarez-Chavez e Irenilza Nääs	18
Tools for Sustainability	André Coimbra Felix, Carlos A. Di Agustini and João S. Furtado	28
Emissions Registration and Transfer of Pollutants (RETP)	Marcus E. M. da Matta and Mirtes Vieitas Boralli	19

The expressive number of 267 participants, distributed along the workshops, showed the increase of concern on this type of group activity by the academy community. Figure 3 shows the profile of participants.

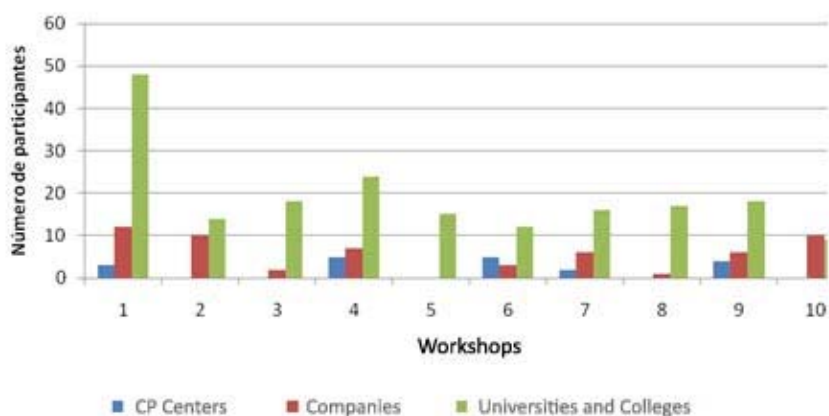


Figure 3. Profile of workshops' participants at the 3rd International Workshop: Advances in Cleaner Production.

### Visibility

The visibility of the event and the search for information through the website increased significantly (Figure 4). The increase of the number of visits to the website can be evidenced by the crescent trend of graphic (Figure 4). The first peak with 674 visits is simultaneous to the **1st Workshop**, held in November 2007. Subsequent peaks (739 and 529 visits) are related to the Call for Papers for the **1st Special Issue** – Journal of Cleaner Production. The peak that corresponds to 1180 is related to the **2nd Workshop** (May 2009) and the subsequent ones to the Call for Papers for the **2nd Special Issue** – Journal of Cleaner Production. The last peak is simultaneous to the occurrence of the **3rd Workshop** (18, 19 and 20 May 2011).

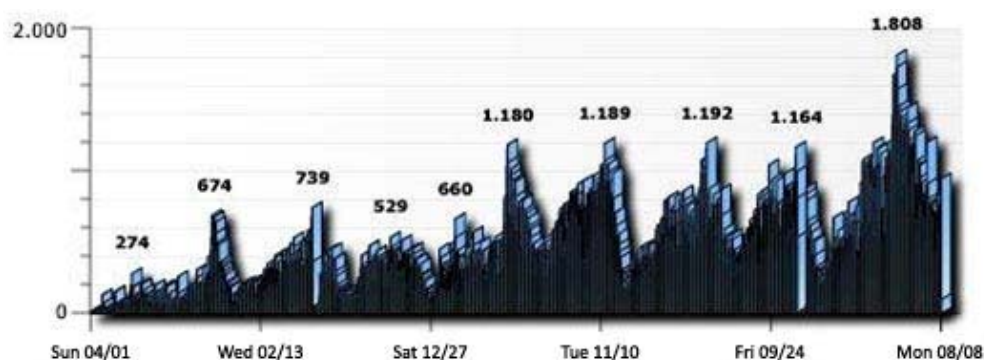


Figure 4. Number of visits to the website [www.advancesincleanerproduction.net](http://www.advancesincleanerproduction.net) from April 2007 to May 2011.

Since its creation the website had 700.000 visits (Table 3), and last year accesses surpassed the number of de 172.000.

Table 3. Report of the number of visits to [www.advancesincleanerproduction.net](http://www.advancesincleanerproduction.net), since the website creation (April 2007).

<b>Total visits</b>	<b>690.970</b>	Average visits per day	434
Total printed page	1.459.152	Average printed page per day	917
Total Hits	4.901.339	Average Hits per day	3.079
Total Bytes Transferred	262,28 GB	Average Bytes transferred per day	169 MB


### ***Evaluation of the conference according to the goals***

It is considered that the conference planned and hosted by the Paulista University was a great success reaching fully its objectives, namely:

- The goal of academic information exchange has been fully achieved, by the significant number of participating academic institutions (82 universities and colleges and the presentation of 144 academic contributions).
- 
- The presentations of recent achievements made by companies (featuring success experience): thirty two organizational reports were presented in oral form and forty four companies were actively present at the conference. In this way, this objective was achieved. In this way, the event promoted share of knowledge between academic and corporate experience.
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- The discussion of common problems and routing of solutions was extensively covered by the plenary sessions, oral presentations and, particularly, at the nine workshops.
- The increase in international relationship through individual and institutional contact was a goal achieved. Participants of 14 countries attended the conference.
- The deepening of the discussion on the fundamental theme of the event "Cleaner Production Initiatives and Challenges for a Sustainable World"
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### ***Evaluation of the conference according to audience***

The audience in the oral presentation rooms received a form for conference evaluation (Figure 5).



São Paulo - Brazil - May 18-20, 2011

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**FORMULÁRIO DE AVALIAÇÃO DO EVENTO**

Este questionário tem como objetivo a melhoria do evento numa próxima edição.  
Por gentileza, conceda-nos alguns minutos de seu tempo para responder às questões abaixo, manifestando sua opinião sobre o evento.

a) Você avalia que o evento atingiu \_\_\_\_\_ % (de 0 a 100) de seu objetivo.

b) O evento correspondeu a sua expectativa? ( ) Sim ( ) Não

c) Você considera importante o apoio de instituições parceiras a este tipo de evento

d) Qual é a sua avaliação dos assuntos abaixo?

	Ótimo	Bom	Regular	Insuficiente	Ruim
Organização do evento	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instalações	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Atendimento	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comente, se desejar:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Figure 5. Evaluation form distributed to participants at the 3rd International Workshop: Advances in Cleaner Production.

Accordingly to the evaluation of 60% of the participants, the event's goals were achieved in more than 90%. On the average score, goals reached 88% of it was expected. The conference attained the audience expectations of all respondents. Partnerships and sponsorship of other institutions were considered important by 100% of participants who answered the form.

Regarding the organization of the conference, 88% consider this item as excellent / good. The facilities were considered excellent / good by 95% of respondents and 98% considered the service excellent / good. There were no insufficient or bad assessments.

***Acknowledgments***

The success of the International Workshop would not have been possible without the support of important partners such as FAPESP and CAPES, significantly to the event's achievement.

The Vice Dean of Post Graduate Studies and Research UNIP was responsible for infrastructure support, as well as for providing teachers and students of the Tourism, Secretarial, Pedagogy and Marketing courses who were active members of the Supporting Committee.

The Organizing Committee thanks all the institutions involved and, in particular, lecturers and other participants that made the conference possible.