University-industry interaction on cleaner production
The case of the cleaner production center at the University of Cienfuegos (Cuba)
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Aim

» 1. Master degree on cleaner production at the University of Cienfuegos (UCf)
» 2. Cleaner Production Center (CPC) at the UCf
» 3. Interuniversity collaboration
Outline

» 1. Context
» 2. Master degree
» 3. Cleaner Production Center
» 4. Conclusions
CP context

» 1. Sustainable development
» 2. Circular/efficient use of inputs; limit pollution
» 3. Improve environmental performance and competitiveness
University context

» 1. Training: master, Ph. D
» 2. Research: Supporting training and services/consultancy
» 3. Social responsibility: Example role (e.g. on environment/SD); inking up the university with industry, SMEs, and service sector
CPC context

» 1. Supporting the CP implementation in the production and service sector
» 2. Cultural, economic, regulatory differences (international, regional, local)
Cuban context

» 2. National environmental strategy on CP since 2000s; limited results
» 3. National Cleaner Production Network (UNIDO-UNEP) since 2001
Barriers implementing CP in developing countries

» 1. Environmental awareness and culture
» 2. Trained and equipped staff – capacity
» 3. International networking
University of Cienfuegos (UCf)

» 1. 4000 students; 450 academic staff
» 2. Faculties of engineering, agro-sciences, economics and management, social sciences, humanities
» 3. Provincial priority issues mission
Province of Cienfuegos (Cf)

» 1. Southern-Central Cuba
» 2. 150,000 inhabitants in a WHS
» 3. Pollution originates from agriculture, industry, tourism, households
» 4. Particular concern: fast degrading bay water quality
Need for CP in Cf

1. Focus on energy, water, waste, EMS
2. By 2007 Cienfuegos did not deal with CP
3. Stakeholder questionnaire revealed the need for research, guiding industry and consultancy on CP
4. Pilot projects showed significant results could be reached
Specific context of CP in Cf

1. Cuban companies are state owned; limited and regulated market participation opportunities
2. UCf does not undertake commercial activities
3. Province targeted issues: Local industry/SMEs; pollution of the bay; SD of the city and the province
UCf reply to this context

» 1. Master degree on CP
» 2. Supporting research
» 3. Center of CP
» 4. International cooperation
Master in Cleaner Production at UCf

» 1. Target audience: Professional managers of CP in their organization
» 2. Interdisciplinary concept: environment/SD, engineering economic, social aspects
» 3. Structure: 4 modules/12 courses and a thesis
» 4. Quality management
  * Internal
  * Accredited by the competent Cuban authorities
# Master degree promotions

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<th>Promotion</th>
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Inter-university collaboration on master program

1. In complement to Cuban contributions, transposing courses from Europe to UCf: Waste management, water treatment, SD, (instruments for) environmental management

2. Interactive/involving training approaches: Discussions, workshops, student assignments

3. Staff exchange, Ph. D training, publications
CP Center at the Ucf (since 2008)

1. Aim: Protagonist on implementing CP (industry, service sector)
2. Approach: Focus on environmental quality and energy
3. Research projects on CP
   * Thesis support
   * Priority: Main pollution activities
4. Workshops
Inter-university collaboration on CPC activities

» 1. Advice and co-guidance master and Ph. D research

» 2. Research lines:
  * Inventory of pollution sources and emissions in Cf
  * Energy valorization of biomass
  * Sustainability indicators for Cf

» 3. Participation in workshops

» 4. Project management
Conclusion (1/2)

1. Master thesis projects result in **measurable improvement** of pollution and its effects

2. **Synergism** between master program and the CPC on
   - Bridging university an societal stakeholders
   - Improving environmental quality
   - Guidance on SD
Conclusion (2/2)

3. North-South cooperation on:
   * Capacity building and expertise transfer
   * Internships
   * Publications

4. Prospects
   * Inter-university Ph. D program