

DEFINING AND MONITORING ECO-EFFICIENCY INDICATORS VALUED FROM DIFFERENT PERSPECTIVES

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Background Research

works:

(1) National Programme (Government of Romania): "***Guideline for Eco-Efficiency Promotion in Industrial Development***" – 2005

(2) UNIDO Project: "***Sustainable Development of Enterprises in Romania with focus on enhancing the local expertise in Cleaner Production - CP and Corporate Social Responsibility - CSR methodologies in the tourism industry***" – in progress

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Project consortia:

- **Project 1:**
 - *6 R&D institutions*
 - *4 Pilot industries:*
 - *Chemical*
 - *Metallurgical*
 - *Pulp & Paper*
 - *Textile*
- **Project 2:**
 - *International experts*
 - *Local consultants*
 - *15 CP trainees*
 - *Pilot HOTELS (8 in 2008)*

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Semantic aspects only?

Although basically synonyms,

- *Eco-Efficiency (EE)* targets the economical and environmental dimensions, emphasising their inter-relation
- *Cleaner Production (CP)* is also positioning inside the process, facing the environment, while
- *Pollution Prevention (P2)* is perceived as positioning more outside than inside the process

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INDICATORS

Set of **RELEVANT INDICATORS** that respond to different kinds of user needs:

- to track sustainability
- to compare between
 - regions
 - branches or branch standards
 - units (*benchmarking*).

Minimum set for industrial branches

1. **Material consumption** (*material intensity, similar to MIPS - Material Input Per **Service Unit** or **Unit of PRODUCT***)
2. **Energy consumption** (*energy intensity, similar to EIPS - Energy Input Per Service Unit or Unit of PRODUCT*)
3. **Non-products generation** (*ecological rucksack in MIPS approach, but also similar to **waste generation intensity** - National RoundTable on the Environment and Economy - NRTEE, Canada*) and
4. **Discharges / Emission of specific pollutants.**

APPLICABLE TO ALL FOOD
industries

Eco-Efficiency INDICATORS:

Material consumption, total (I1) , out of which	Biotics (I1.1)	Abiotics (I1.2)
Energy consumption (I2)	Electrical Energy (I2.1)	Thermal energy (I2.2)
Water consumption (I3)	Technological water (I3.1)	Cooling water (I3.2)
Air consumption (I4)	Technological air (I4.1)	For physical operations (I4.2)

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industries

Environmental performance INDICATORS:

Wastewater discharged (I5)	Total flow (I5.1)	Total recycled (I5.2)	Specific discharge of contaminants (COD – I5.3, BOD – I5.4, a.s.o.)
Waste generated (I6)	Recycled (I6.1)	Reused / Processed (I6.2)	Dumped (I6.3)
Gas Emissions, total (I7)	CO₂ (I7.1)	VOC (I7.2)	Others identified: I7.3, I7.4, a.s.o.

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Applicable to HOTEL industry

Definition of the SERVICE UNIT:

- **SEPR** (*Service Energy Performance Rate - Switzerland*)
- **Guest.night** (or "**overnight**") - EU Life Programme & Envorowise, UK
- **Weighted Guest.night** – EU Life Programme

Factor of weighting "OVERNIGHTS": to consider also the "HOT MEALS"

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Key Performance Indicators - KPIs for HOTEL industry

- 1. Total energy consumption** (kWh/SEPR, /overnight and weighted overnight)
 - 1.1 Electricity** (kWh/SEPR, /overnight and weighted overnight)
 - 1.2 Heating energy** (kWh/m² of heated / cooled-area)
- 2. Water consumption** (m³/SEPR, /overnight and weighted overnight)
- 3. Solid Waste** (kg or l/SEPR, /overnight and weighted overnight)
- 4. Chemicals** (cleaning products) (kg/SEPR, /overnight and weighted overnight)

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Methodological approach -
similar to both PROJECTS:

- *Training of the branch or new consultants on CP*
- *Selection of representative pilots and conducting CPA*
- *Defining and calculating relevant indicators at the project start ("level 0")*
- *Setting CP Action Plan and implementation of CP Measures ("level 1" indicators).*

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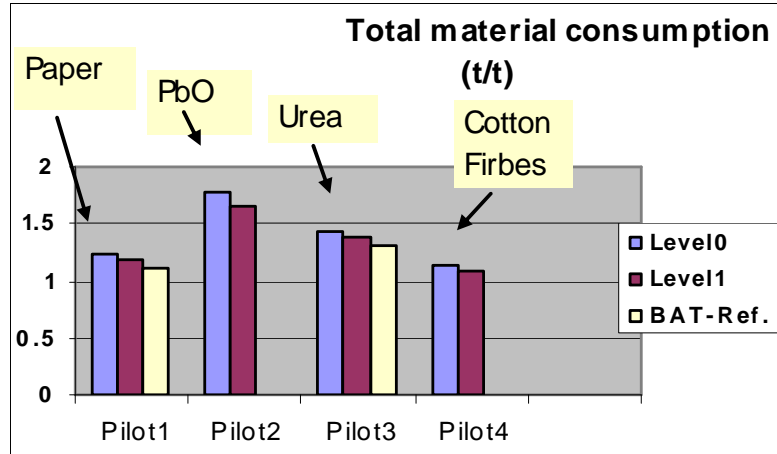
OVERALL RESULTS
INDUSTRIES

Industry/ Process	CP Assessment			
	CP Measures (no.)		Financial effects (Euro)	
	Found/ no cost	Implement ed/no cost	Cost	Benefits (per year)
Paper - Wellenstoff	74/32	20 / 5	2,853	84,864
Metallurgy - PbO	2 / 2	2 / 2	0	75,600
Chemical Ind. - Urea	33 / 7	12 / 6	406	3,224
Textiles - Dying	32/ 13	13 / 11	320,000	370,000

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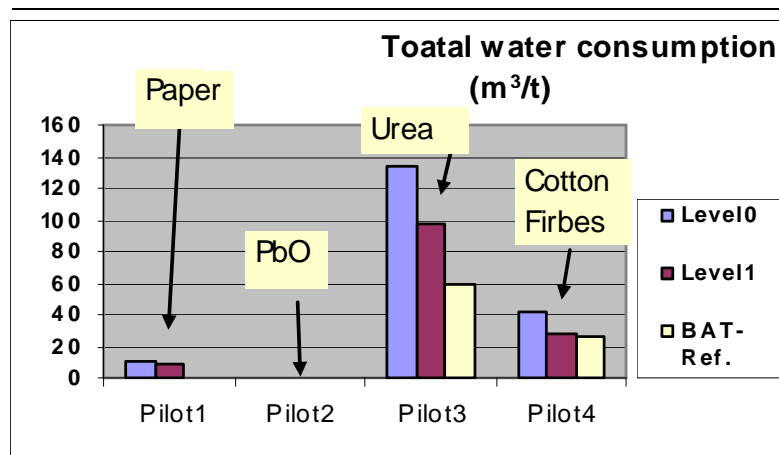
Overall Results INDUSTRIES



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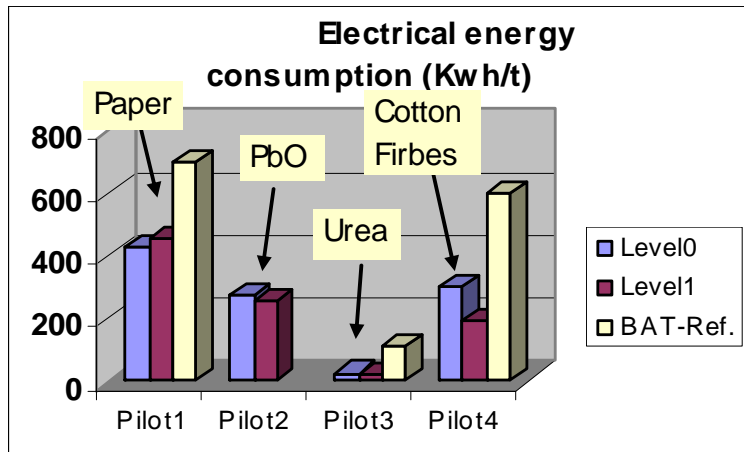
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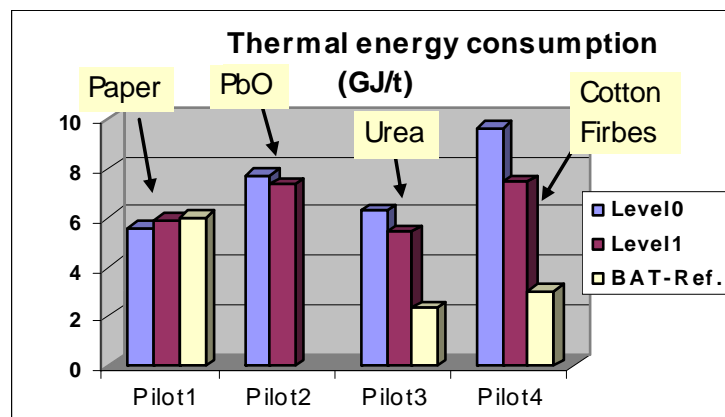
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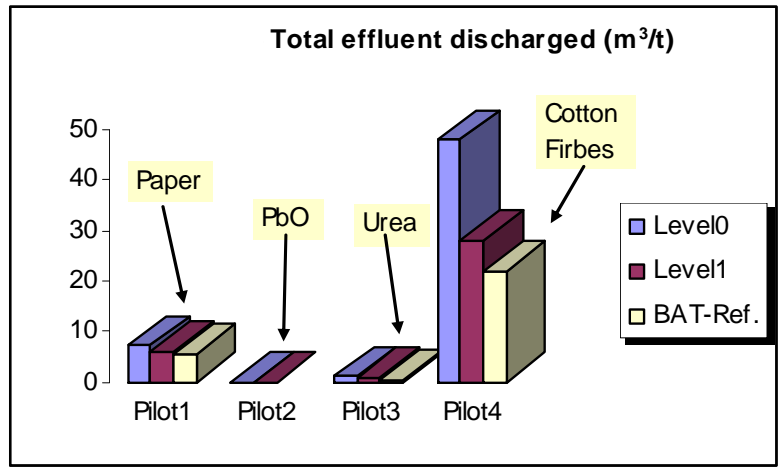
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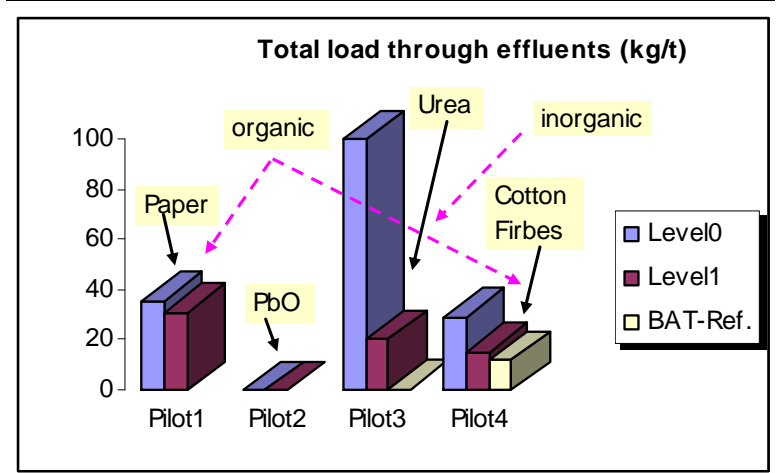
Overall Results INDUSTRIES



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Overall Results INDUSTRIES



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Overall results

HOTEL Industry

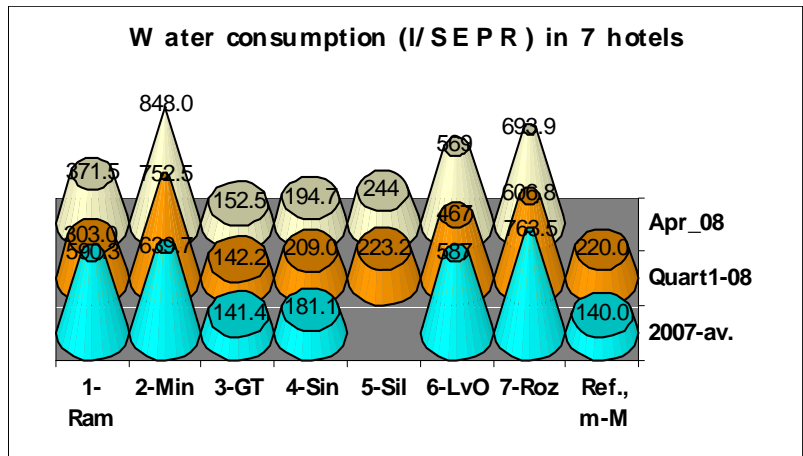
Hotel characteristics (8 hotels in 2008):

- **3 and 4-star hotels**
- **Placed in Bucharest and Prahova Valley**
- **Customers:** Business segment mostly
- **No. of rooms:** 60 ÷ 244
- **No. of beds:** 92 ÷ 458
- **Restaurants:** Yes, all (1 or 2) & **Conference rooms**
- **Laundry:** 5 – Yes; 3 - No
- **Wellness:** 5 – Yes; 3 - No

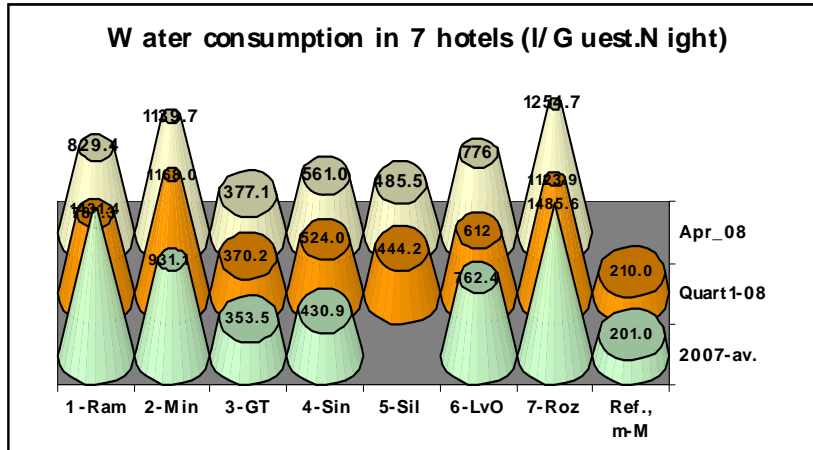
Overall results

HOTEL Industry

Water consumption (l/SEPR) in 7 hotels



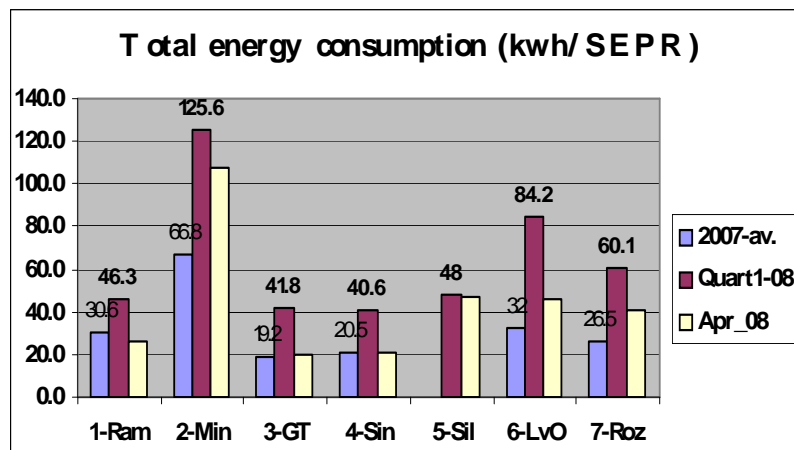
Overall results - HOTEL Industry



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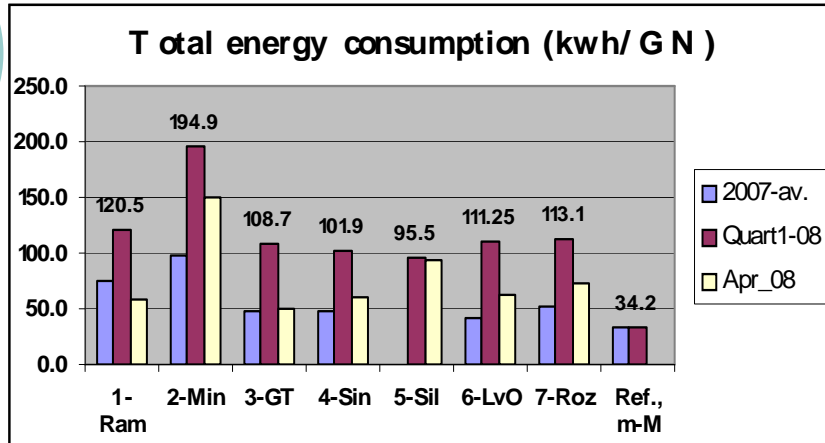
Overall results - HOTEL Industry



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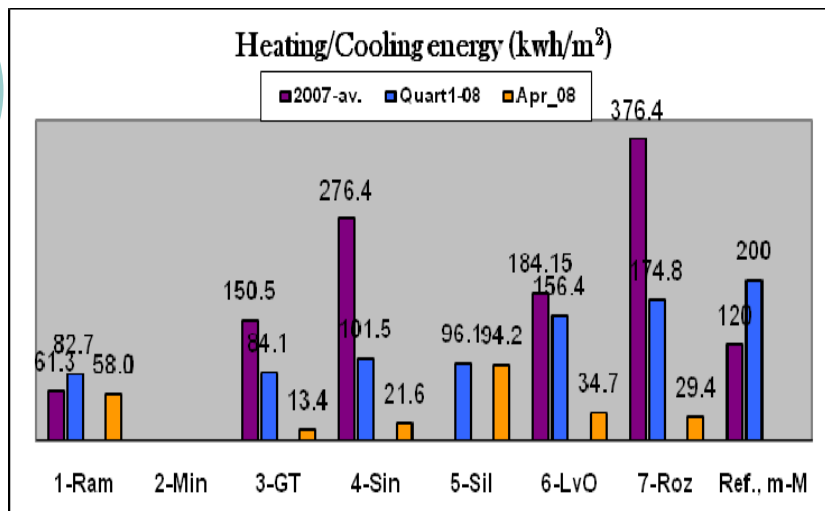
Overall results - HOTEL Industry



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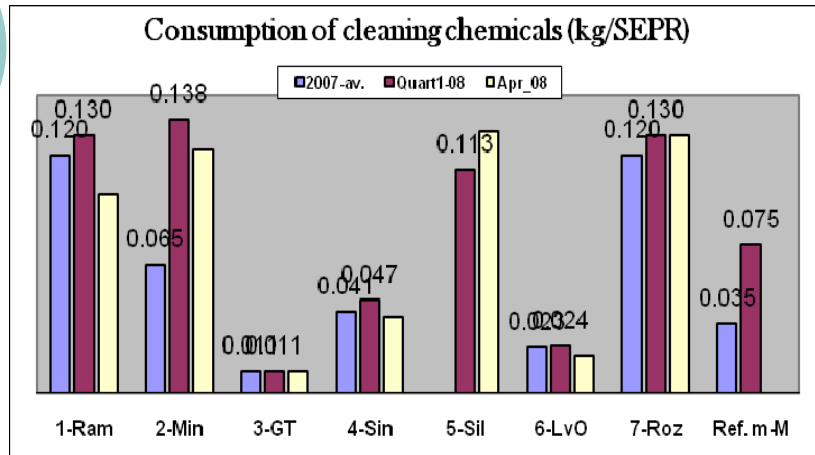
Overall results - HOTEL Industry



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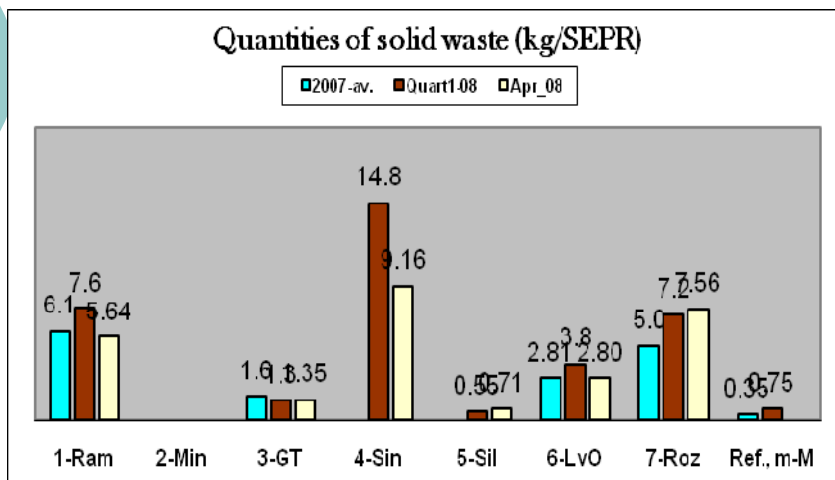
Overall results - HOTEL Industry



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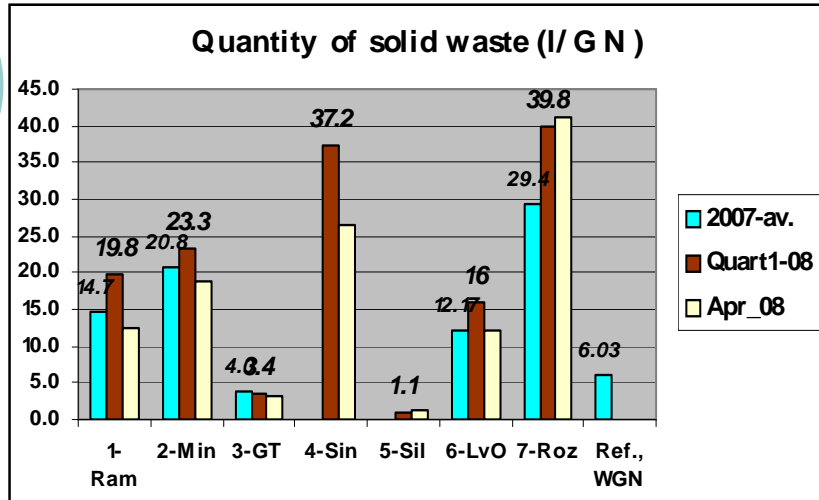
Overall results - HOTEL Industry



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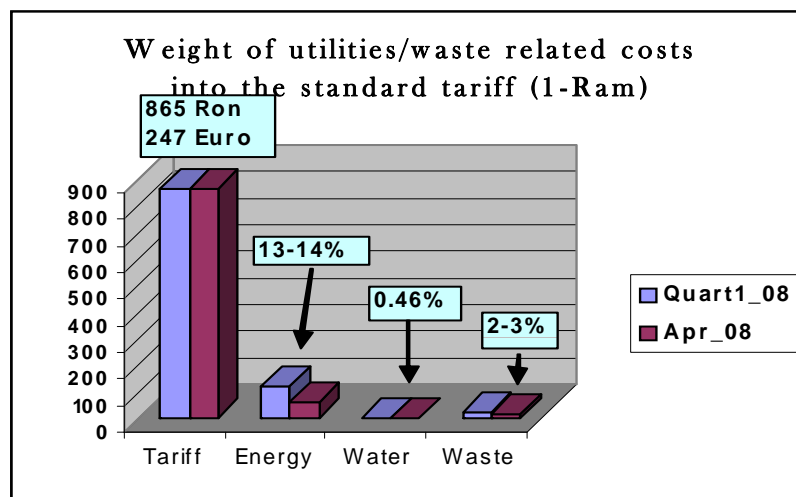
Overall results - HOTEL Industry



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Cost - related aspects



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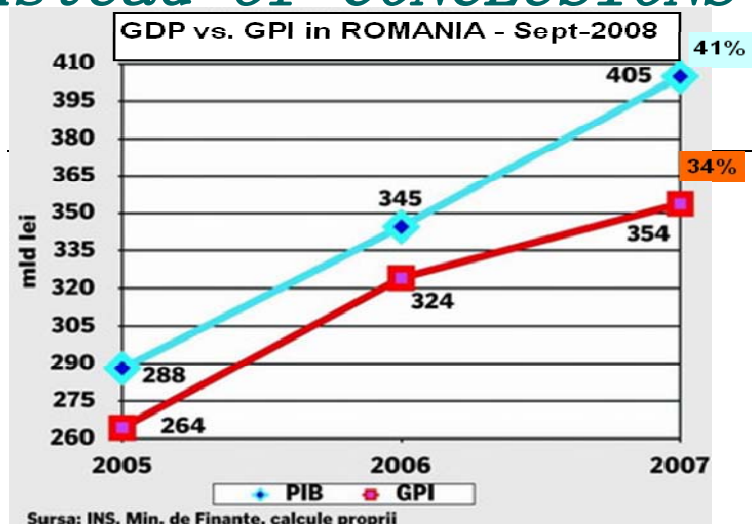
Why calculating and monitoring relevant indicators?

- **for Management:** as permanent information about the unit performance
- **at Economic Sector level:** to benchmark between units
- **at Region level:** to foster linkages that make better use of region resources
- **at National Economy level:** to guide on the economy composition, the size of individual sectors together and various, necessary sectoral changes

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Instead of CONCLUSIONS



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Thank you!