



The Metrics Framework Developed for the Enviroclub Initiative

*Quantitative and Qualitative
Performance Indicators Applied to
Real-World Projects*

Enviro-Access' Mission



To foster the emergence and support the development of innovative projects and businesses that contribute to the improvement of the quality of the environment and to sustainable development on a local, national and international scale...

by...

- Supporting environmental technology companies in the development of innovative solutions
- Managing/coordinating various complex multi-stakeholder projects
- **Implementing profitable pollution prevention practices focused on improving the profitability and competitiveness of manufacturing companies**

The Enviroclub Initiative



- A vehicle for voluntary pollution prevention (P2) action
- Brings together groups of ± 15 companies using a regional approach
- Duration: 6 to 10 months
- Interactive workshops and sharing of experience
- Project definition costs: 0 \$
- The company receives 90 hours (8 100\$) of consulting services to **implement** a project
- Technical validation from Environment Canada
- Registration fee: 2 500 \$

THE Enviroclub PROCESS



1. FIRST STEP

Define a Project and Choose a Consultant

2. SECOND STEP

Have the Project Approved by Environment Canada and Registered

3. THIRD STEP

Implement the Project

4. FOURTH STEP

Measure Results and Communicate / Market them to Stakeholders

PARTNERS



- Industrial SMEs
- Environmental/process consultants
- Club co-ordinator (Enviro-Access)
- **Environment Canada**
- **Canada Economic Development**
- **National Research Council Canada (NRC-IRAP)**
- **Local Partners**

HOW IT WORKS



Project Definition

Study of Options,
Detailed Design

Execution, Implementation

Follow-up

Compilation
(Co-ordinator)



- 1- Approval by EC
- 2- SME signs and pays 2500\$
- 3- Contract is signed with consultant

Interim report

Final report

 : Consultant's mandate

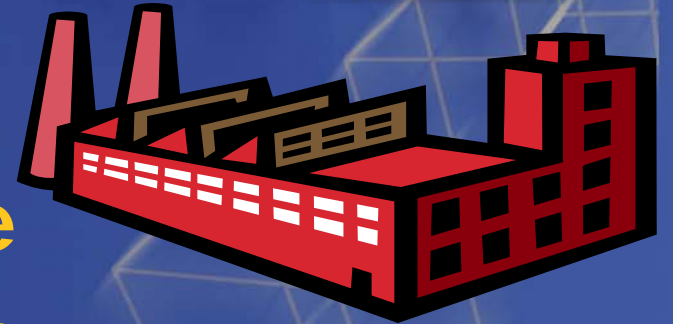
 : Workshops

ELIGIBLE P2 PROJECTS



Pollution Prevention:

- Reduction of resource use
- Re-use or recycling on site
- Reduced use, generation or discharge of toxics
- Substitution of raw materials
- Improvement of operating practices
- Optimization of process



METRICS FRAMEWORK



Indicator Types Examples

QUANTITATIVE

- Intensity indicators
- Absolute indicators
- Rate-based indicators

Scientific

units/tonne
m³ of water
t CO_{2eq}/year

Popularized

N/A
Olympic pools
car/yr equivalents

QUALITATIVE

Employee Motivation ↑
Complaints ↓

METRICS FRAMEWORK



Performance Indicators

- **TECHNICAL or PRODUCTION BASED (Project specific)**
- **ECONOMIC (Annual rate-based for aggregation)**
- **ENVIRONMENTAL (Annual rate-based for aggregation)**
- **SOCIAL (Usually qualitative)**

METRICS FRAMEWORK



Indicators

	Technical and production-based		Quantified for each project, but not aggregated
Quantitative (33 scientific, 17 popularized)	Economic		8 Indicators (Capital invested, avoided costs, payback period, etc.)
	Inputs	Energy	5 Indicators (4 specific, 1 aggregated)
		Raw Materials	3 Type A (2 specific, 1 miscellaneous with identifier) 1 Type B (chemical substance with identifier, quantity, density, class)
	Outputs	Products (and/or services)	Quantified for each project, but not aggregated
		Pollutants	7 Gaseous or atmospheric (6 specific, 1 miscellaneous with identifier)
			7 Aqueous or effluent-borne (5 specific, 1 miscellaneous with identifier)
			2 Solid or liquid (hazardous or other with identifier)
Qualitative (22)	Impact Types		7 Types (6 specific, 1 miscellaneous with identifier)
	Parameters		5 Parameters (odors, dust/particulates, noise, incidents, product life)
	Social		10 Types (Working conditions, health & safety, etc.)

METRICS FRAMEWORK



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Indicators

Quantitative (33 scientific, 17 popularized)	Economic	8 Indicators	Capital invested, Total project cost, Subsidized costs, Recurring annual savings, Simple payback period, NPV, IRR, Increase in plant capacity
	Environmental	5 Energy	Petroleum Products, Electricity, Natural gas, Propane, Aggregate: GJ
		3 Type A	Water, Wood, Miscellaneous with identifier
		1 Type B	Chemical substance with CAS identifier, Quantity, Density, Class
		7 Gaseous or atmospheric	GHG: CO _{2eq} , VOCs, PM ₁₀ , NO _x , SO _x , CO, Miscellaneous with identifier
		7 Aqueous or effluent-borne	Volume, BOD ₅ , COD, TSS, Oil & grease, Metals, Miscellaneous with identifier
		2 Solid or liquid	Hazardous waste, Other waste with identifier
Qualitative (22)		7 Project classes	Toxics, Ozone depleting substances, Greenhouse gases, VOCs, Water use, Raw materials, Other with identifier
		5 Parameters	Odors, Dust/particulates, Noise, Incidents, Product life
	Social	10 Types	Working conditions, Health & safety, Social climate, Employee motivation, Employee involvement, Job creation, Community relations, Complaints, Product quality, Other with identifier

CASE STUDY 1



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Ben-Mor Cables St-Hyacinthe, Qc

Ben-Mor Cables, St-Hyacinthe, Qc

Quantified gains after the project:



Indicators	Units	Gains
<u>Technical and Production-based:</u>		
- Reduction of electricity consumption per ft ²	kWh/ft ² /yr	3.2
- Unit cost of energy produced by heating system	\$/kWh _t	0.028
<u>Economic:</u>		
- Reduction in electricity cost	\$/yr	26,424
- Simple payback period	Years	1.9
<u>Environmental:</u>		
- Reduction of electricity consumption	kWh/yr	327,000
- Reduction in energy consumption (aggregate)	GJ/yr	1,179
- Reduction in greenhouse gas emissions	t CO _{2eq} /yr	3.0
- Reduction in NO _x , SO _x , PM ₁₀ , CO, VOCs	kg/yr	8.72, 3.61, 0.29, 1.9, 0.19
<u>Social:</u>		
	↑ Working Conditions (comfort)	
	↑ Health and Safety	
	↑ Social Climate	
	↑ Employee Motivation	
	↓ Complaints	

Ben-Mor Cables, St-Hyacinthe, Qc

Gains after the project:



Indicators	Units	Results
<u>Quantified Economic:</u>		
- Capital Cost	\$	136,050
- Total Project Cost	\$	146,650
- Grants (Hydro-Québec, REDI, Enviroclub)	\$	96,533
- Out-of-pocket costs to Ben-Mor	\$	50,117
- NPV (10% discount rate, 7 year project life, 0% inflation)	\$	78,525
- IRR (7 year project life, 0% inflation)	%	50
<u>Unquantified Economic:</u>		
- Productivity gains (winter & summer)	\$/yr	?
- Absenteeism Reduction	mandays/yr	?

CASE STUDY 2



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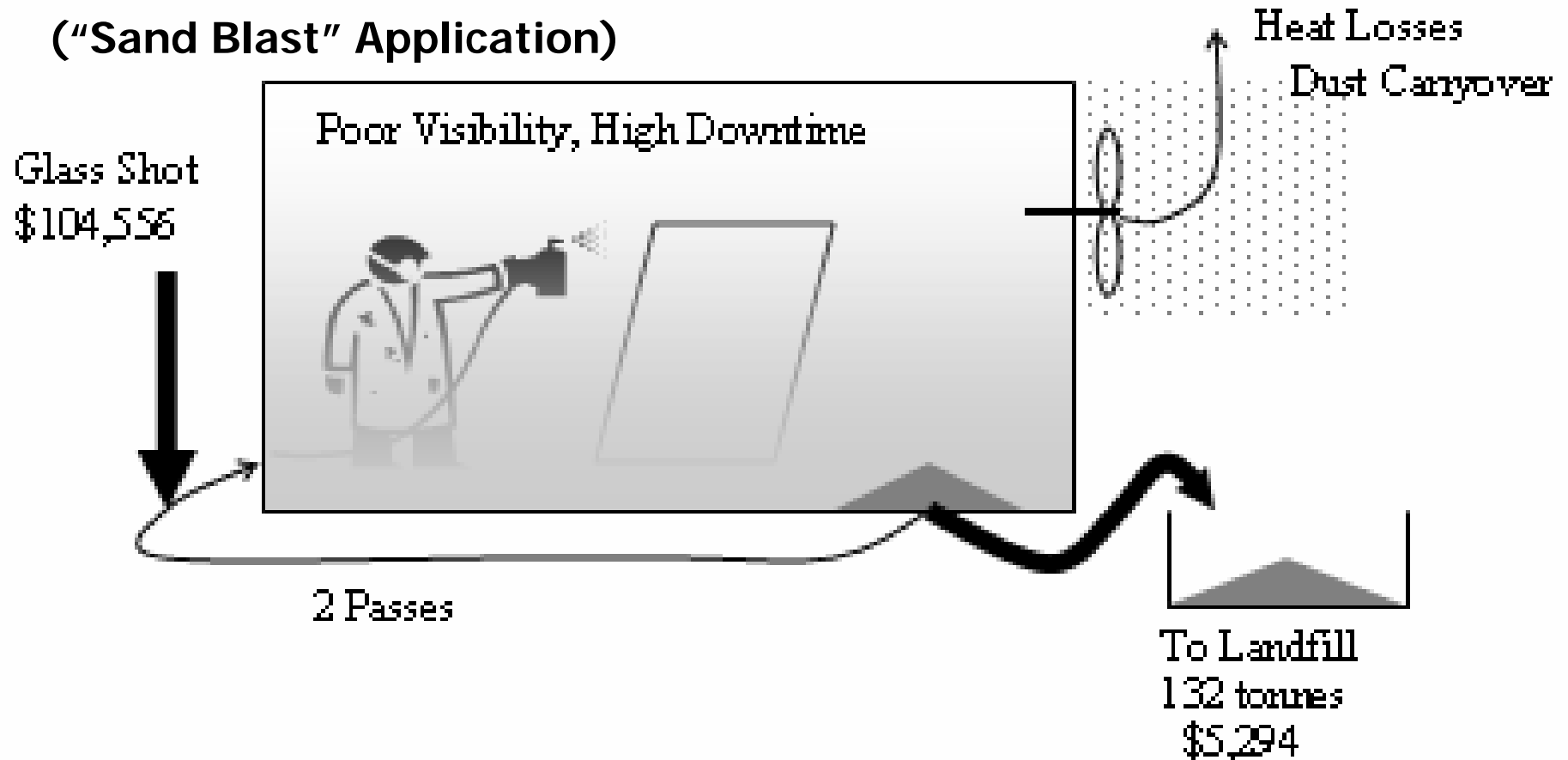
H. Fontaine Magog, Qc

AN Enviroclub SUCCESS STORY

EnviroclubSM

Metal Products Plant – BEFORE

("Sand Blast" Application)

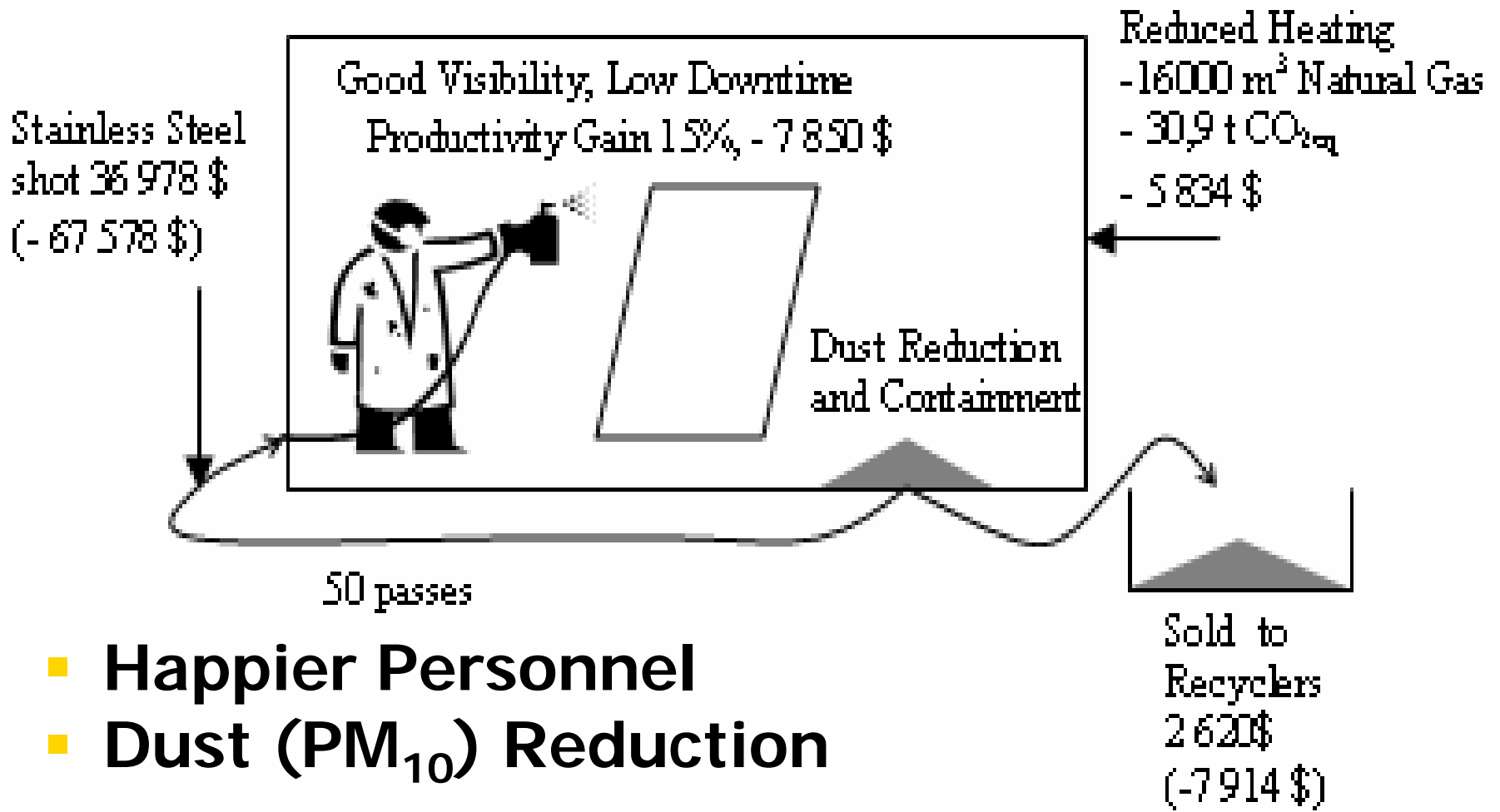


- Glass Bead Abrasive for Stainless Steel
- Problems: Dust, Waste, High Costs

AN Enviroclub SUCCESS STORY

EnviroclubSM

Metal Products Plant - AFTER



- Happier Personnel
- Dust (PM₁₀) Reduction

H. Fontaine, Magog, Qc

Gains after the project:



Indicators	Units	Results
<u>Quantified Economic:</u>		
- Payback period (simple)	years	0.06
- Reduction in operating costs	\$/yr	89,176
- Capital cost	\$	600
- Out-of-pocket costs to H. Fontaine	\$	5,420
- NPV (10% discount rate, 7 year project life, 0% inflation)	\$	428,726
- IRR (7 year project life, 0% inflation)	%	1645%
<u>Unquantified Economic:</u>		
- Reduction in machine tool wear costs	\$/yr	?
- Reduction in OHS insurance costs	\$/yr	?
<u>Social:</u>		
	↑ Working Conditions ↑ Health and Safety (Silicosis risk eliminated) ↑ Employee Motivation ↑ Community relations ↓ Complaints	

Enviroclubs IN QUEBEC



14 Completed Clubs :

- 1 club Eastern Townships (Estrie)
- 3 clubs Montérégie
- 2 clubs Montréal
- 1 club Québec Centre
- 1 club Portneuf
- 3 clubs Saguenay Lac Saint-Jean
- 1 club Beauce
- 1 club Lower St-Lawrence
- 1 club North Shore

Clubs presently active:

- Club Outaouais 2006
- Club Laval-Lanaudière-Laurentians 2006
- Club Chaudière-Appalachians 2006

RESULTS

Enviroclubs completed at the end of 2005

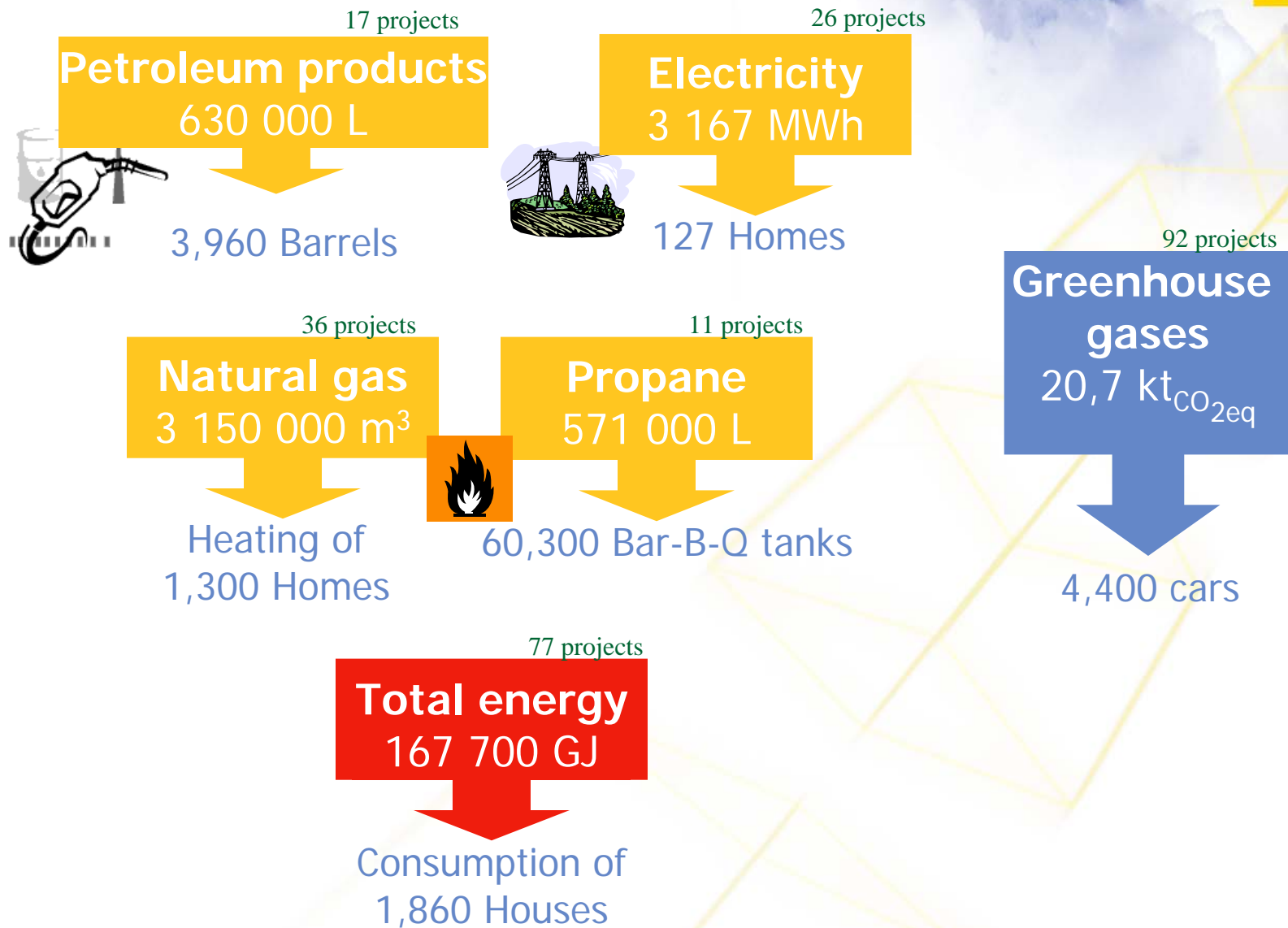


- 14 clubs completed (169 SMEs)
- 144 implemented projects
 - 17 EMS projects
 - 127 technical projects
 - **72%** (92) Greenhouse gases,
of which **61%** (77) were energy related
 - **71%** (90) Toxic Substances (CEPA) (13 T, 5 T+EE, 72 EE)
 - **50%** (64) Miscellaneous (use of raw materials such as water, wood, chemicals; or product eco-design; or reuse/recycling, etc...)

ANNUAL ENVIRONMENTAL GAINS

127 P2 projects implemented (end of 2005)

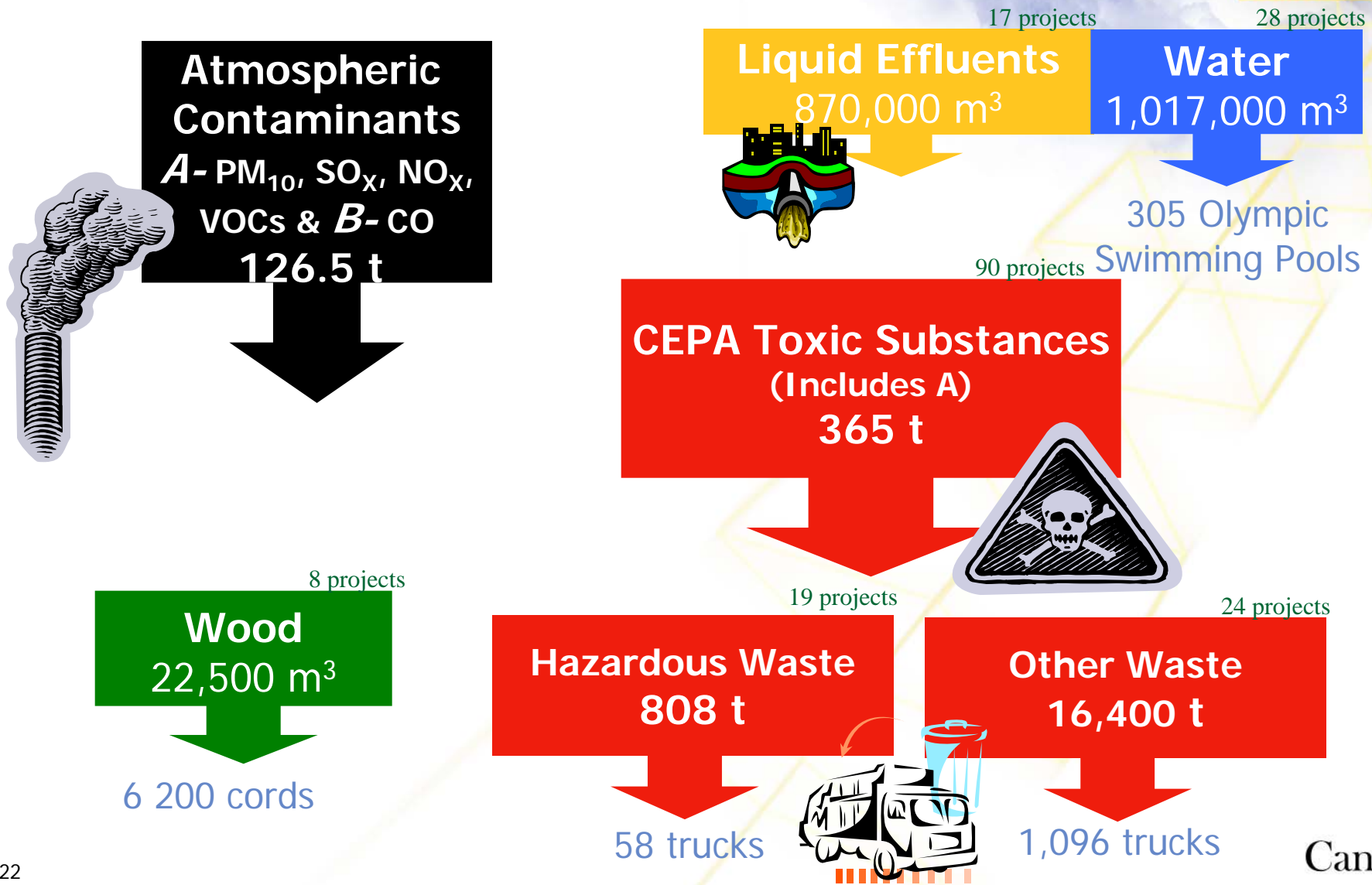
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ANNUAL ENVIRONMENTAL GAINS

127 P2 projects implemented (end of 2005)

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ECONOMIC ANALYSIS

127 P2 projects completed (end of 2005)



Average per company

Costs

■ Government

\$13-15k

■ Companies

- \$10-15 k + Capital investments
- 127 completed projects: \$73 k
- 118 projects <\$250 k:

total: **\$34 k**

Benefits

■ Recurring annual savings:

- 127 completed projects: \$78 k
- 118 projects <250 k\$:

\$63.1 k

■ Net present value (NPV):

(Discount rate:10%, 7 years, 0% inflation)

\$276 k

■ Internal rate of return (IRR):

(Project life: 7 years, 0% inflation)

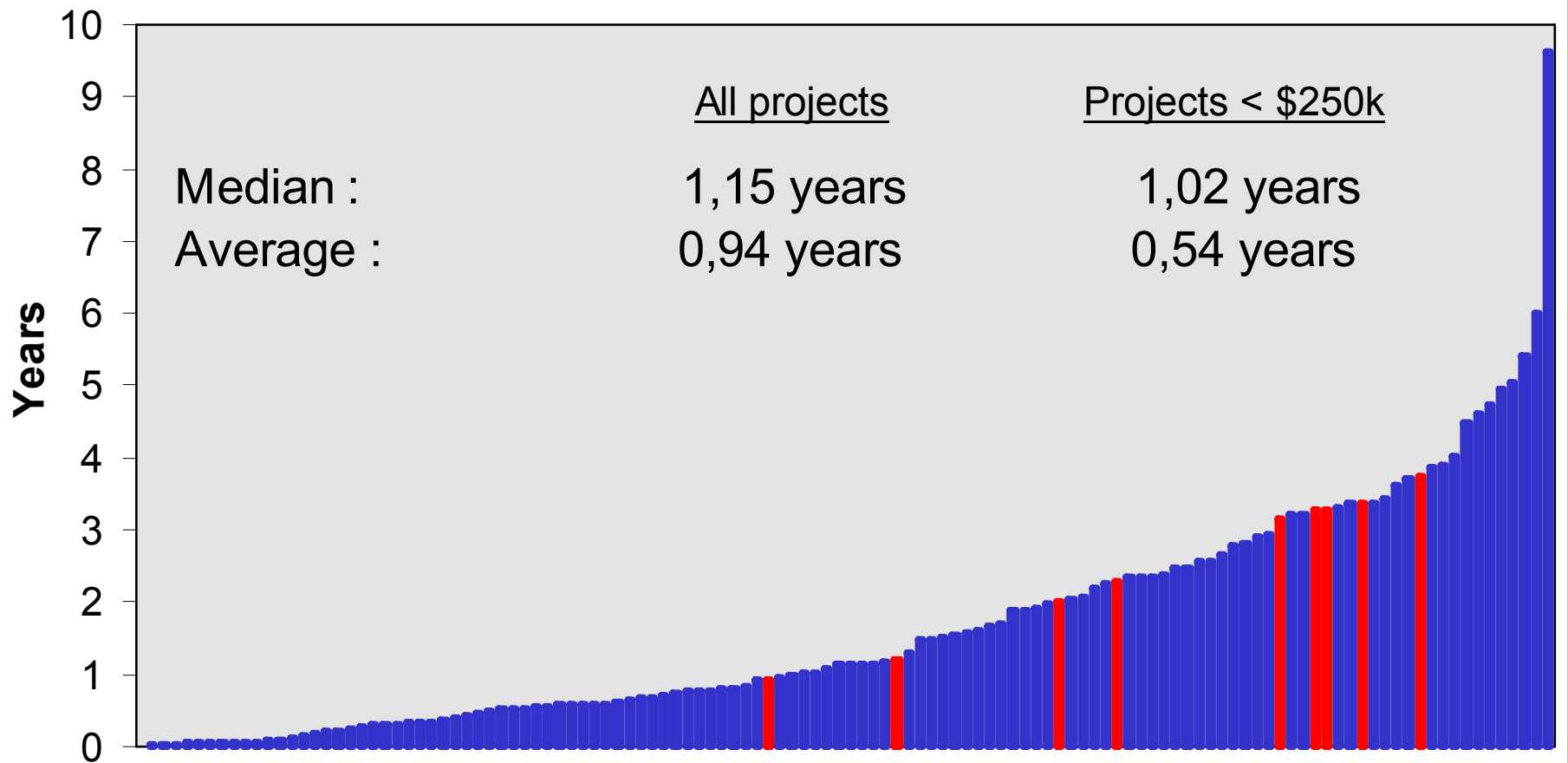
184 %

ECONOMIC ANALYSIS

127 P2 projects completed (end of 2005)



Simple payback period (years)



SATISFACTION RATE



99%

of respondents to the question:

“Would you recommend Enviroclub to a peer?”

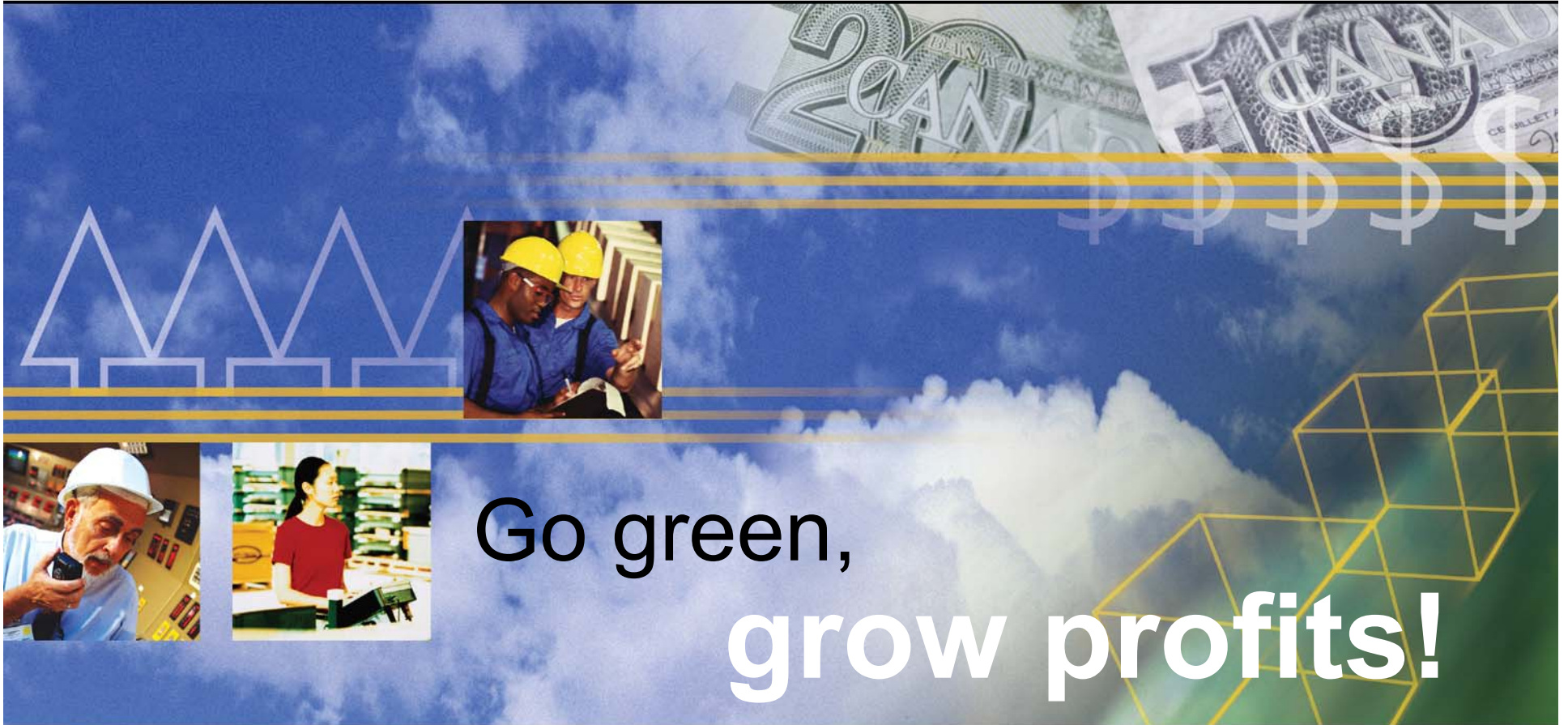
responded

YES

on final evaluation questionnaires.

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grow profits!

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