

Multiple Benefits Example: Surface Treatment Industry

First Industries, Crissier, Switzerland



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Environmental Change Institute



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Replacement of rectifiers

First Industries

Crissier, Switzerland

***Source: Catherine Cooremans, University of Lausanne (with
Greenwatt Fribourg)***

Date: XX-month-year

Multiple Benefits Approach



1. First Industries overview

First Industries is a company active in surface treatment of metal pieces (hot galvanizing, electrolytic zinc plating, powder coating, nickel plating, chromium plating)

Key customer segments, value proposition

Applies any type of surface treatment on the metal parts and products provided by customers. Offers flexibility, quality, reliability and fair prices, and highly-personalized service.



2. Energy & operations

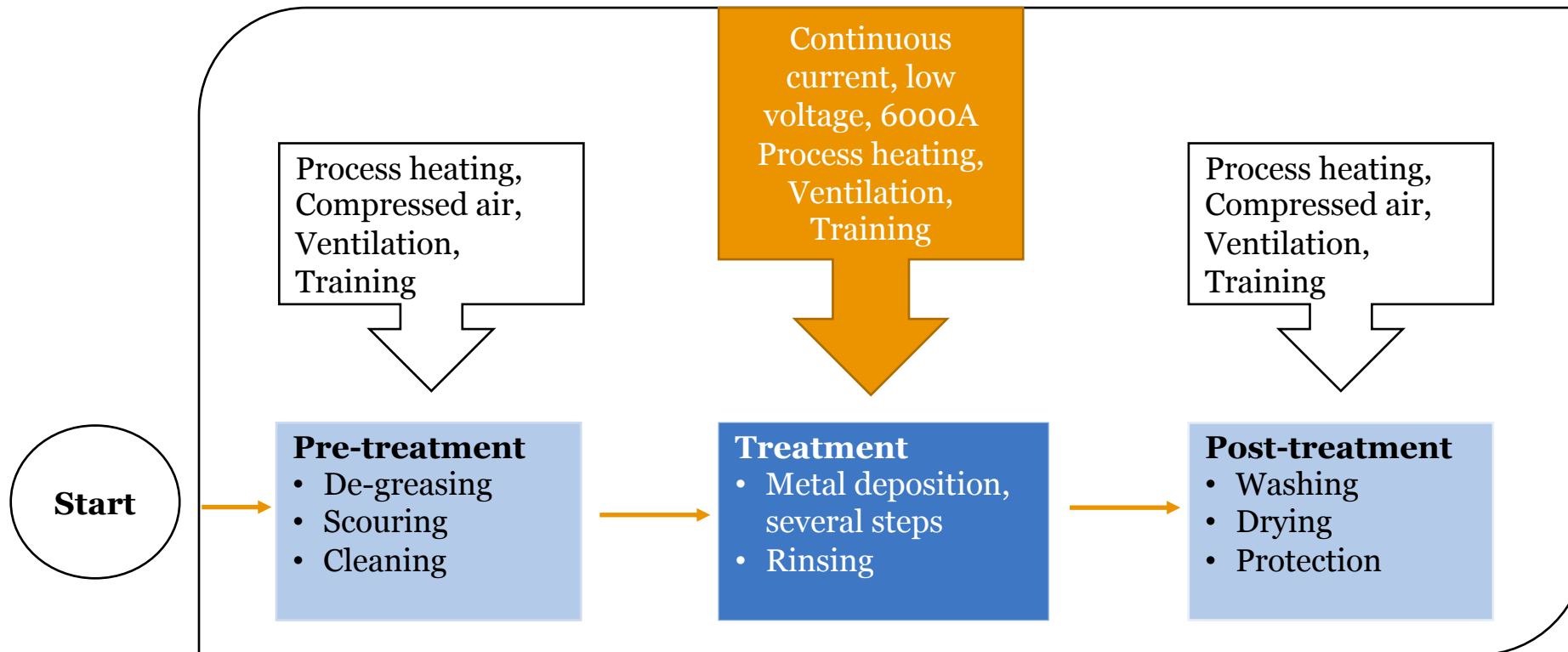
Situational analysis

- Rectifiers¹ obsolete > 35 years
- Low performance (50-60%)
- Insufficient capacity → limits number and size of pieces processed simultaneously
- Difficult and expensive to repair

Project description

- Replace rectifiers with high performance electronic models (85-93%)
- Reduced energy consumption
- Cooling system improvement
- More efficient control system

1: A **rectifier**: an electrical device that converts alternating current, which periodically reverses direction, to direct current (DC), which flows in only one direction. The process is known as *rectification*, since it "straightens" the direction of current. (Source: Wikipedia)



Process analysis: Energy services linked to electrolytic zinc plating process (metals)

Step 2 (cont): Energy analysis

Pre-project

- No metering available
- Estimated average power of 200 kVA consumed (about 50% of rated power)
- Energy consumption: 630 000 kWh/year

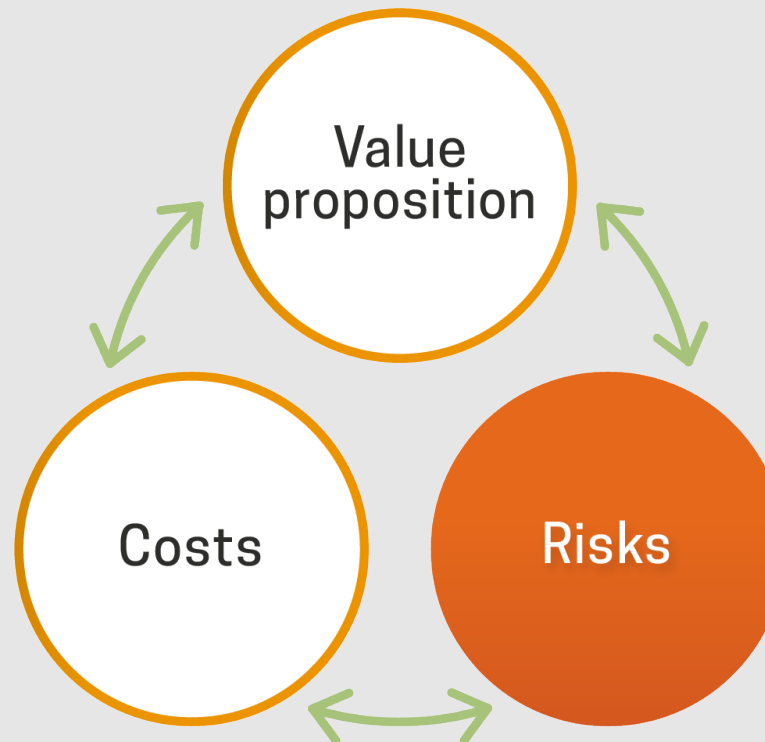
Post-installation

- **10%** improvement
- **63,000 kWh** annual energy consumption savings

Step 3: Strategic analysis

Costs

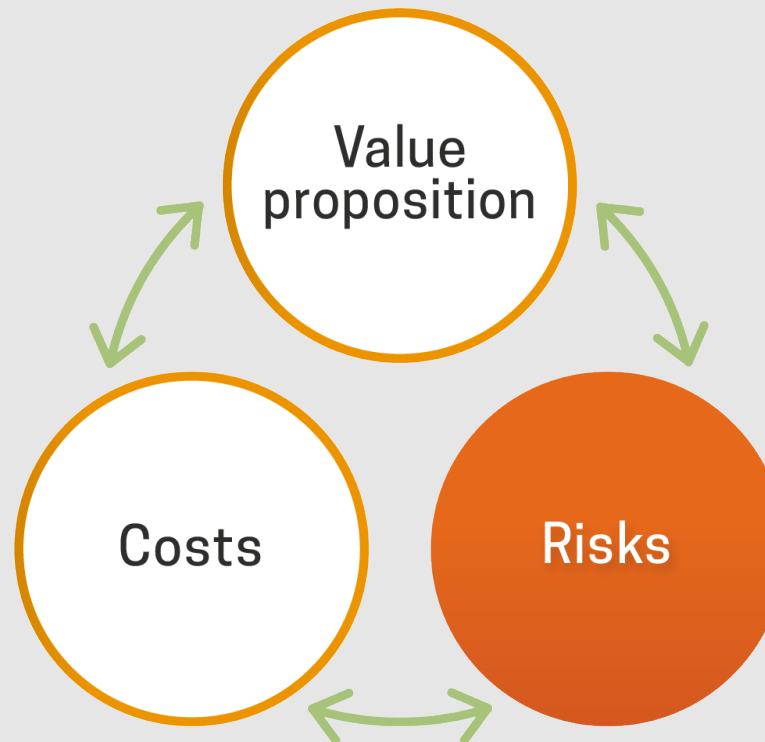
- Reduced raw material use (chrome, zinc), less material waste
- Reduced cooling water costs
- Reduced energy costs
- Reduced labour costs (fewer overtime hours, fewer pieces to re-make)



Step 3: Strategic analysis (cont.)

Costs

- Reduced raw material use (chrome, zinc), less material waste
- Reduced cooling water costs
- Reduced energy costs
- Reduced labour costs (fewer overtime hours, fewer pieces to re-make)



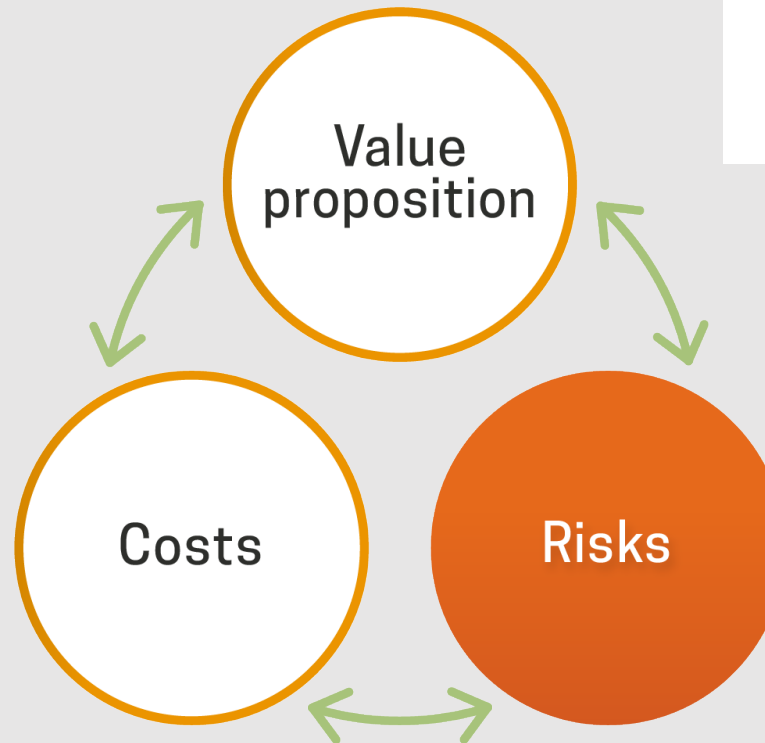
Risks

- Lower commercial risk
- Lower legal risk
- Reduced risk of breakdowns and failures
- Reduced CO₂ risk

Step 3: Strategic analysis (cont.)

Costs

- Reduced raw material use (chrome, zinc), less material waste
- Reduced cooling water costs
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Value proposition

- More stable product quality
- Higher production capacity (higher accuracy)
- Space gain

Risks

- Lower commercial risk
- Lower legal risk
- Reduced risk of breakdowns and failures
- Reduced CO₂ risk

Step 4: Financial analysis

Without Multiple Benefits	
Net present value (NPV)	10,489 CHF
Internal rate of return (IRR)	6.9%
Simple payback	6 years

All Benefits	
Net present value (NPV)	1,904,476 CHF
Internal rate of return (IRR)	118%
Simple payback	0.85 years

Investment duration = 8 years (number of years taken into account to compute NPV and IRR)
Discount rate 6%

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