PRESOURCE

Good Morning!

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Case Study Dairy

For training in Prague

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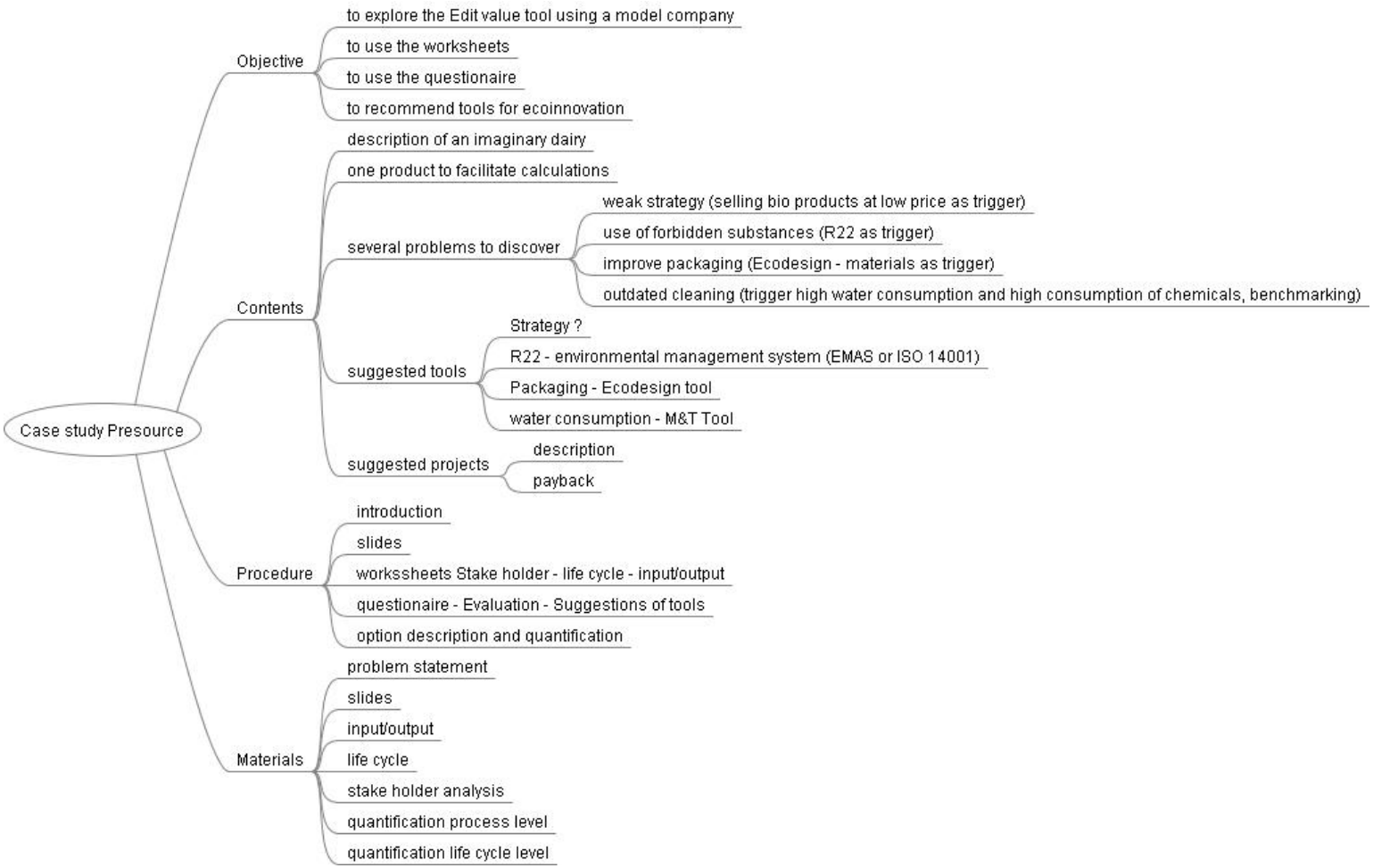

The dairy Resmilk

- Is a cooperative of dairy farmers located in the northern part of Southland
- It employes 100 people
- Works 350 days per year
- Processes milk to drinking milk
- Has a waste water treatment plant
- Has no environmental management system

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The management team

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PRESOURCE Awards

- Was awarded a „cheese oskar“ on the international cheese exhibition the last three years

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Happy cows

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Organisational units

- Management
- Administration
- Consulting farmers
- Production
- Logistics
- Utilities (boiler, chiller)
- Waste management

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Products

	Product	Annual quantity	unit
Milk		68.000	t
	conventional	83,3	%
	bio	11,5	%
	industrial	5,2	%

Inputs

1	Water		175.000	m^3
		From well	100.000	m^3
		From city	74.568	m^3
	Waste water		175.000	m^3
2	Raw milk		70.000	t
3	Film for milk poaches		400	t
4	Crates		4	t

Inputs

1	Water		€/m³
	From well	0	
	From city	1	
	Waste water	1	€/m³
2	Raw milk	0,25	€/kg
3	Film	2	€/kg
4	Crates	2	€/kg

Hazardous materials

Nr.	MSDS	Material	Annual quantity	unit
1	j	Cleaning agents	7.120	kg
2	j	Disinfectants	15.202	kg
3	j	lubricants	647	kg
4	j	Refrigerants (R22)	110	kg

Hazardous materials

Nr.	Material		unit
1	Cleaning agents	2	€/kg
2	Disinfectants	5	€/kg
3	lubricants	2	€/kg
4	Refrigerant (R22)	12	€/kg

Waste

Waste	Annual quantity [kg]
Industrial waste	10.000
Wood pallets	employees
Packaging material	8.000

Disposal cost 350 €/t

Energy

1	Electricity	7	GWh	0,10	€/kWh
2	Natural gas	3.000.000	sm^3	0,35	€/sm^3
3	Diesel	90.000	l	1,3	€/l

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Reception of milk

Cleaning

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Metering

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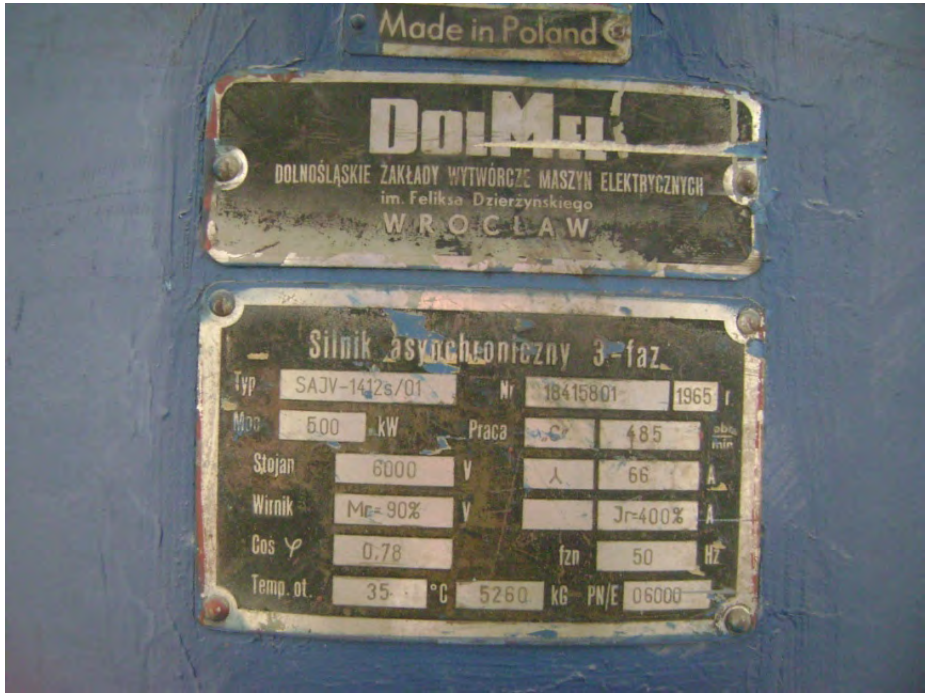
PRESOURCE Pumps



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PRESOURCE Cooling

Cleaning

PRESOURCE

Storage

Cleaning

Pasteurization

PRESOURCE Packaging material

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- No recycled material used for bags and crates

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Filling

Cleaning, cooling,
Packaging waste

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Cleaning

PRESOURCE

Ready made product

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Storage

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Cooling - Compressor

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R22 for refilling

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CIP plant

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Cleaning

- Water from final rinse is not recovered
- Manual control of rinsing

PRESOURCE Benchmarking

	Energy consumption	Water consumption	Waste water
Production of market milk from 1 litre of received milk	0.07 – 0.2 kWh/l	0.6 – 1.8 l/l	0.8 – 1.7 l/l
Production of milk powder from 1 litre of received milk	0.3 – 0.4 kWh/l	0.8 – 1.7 l/l	0.8 – 1.5 l/l
Production of 1 kg of ice-cream	0.6 – 2.8 kWh/kg	4.0 – 5.0 l/kg	2.7 – 4.0 l/kg

Source: European BREF notes, „Food, drink and milk industry“ (http://eippcb.jrc.ec.europa.eu/reference/)

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Waste water treatment

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Boiler

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Steam manifold

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Storage of cleaning chemicals

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Food waste

- 25% of products is not consumed!

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FORMS

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TABLE 1: TOP 20 inputs – Quantification of process losses [based on annual data]

No	A Input	B Total amount [unit]	C Total costs (EUR)	D Product Output %	E Process loss %	F Process loss (EUR)	G Pollution treatment costs (EUR)	H Total loss (EUR)	Remark (potential for conservation)
1	Raw milk	70.000 [t]	175.00.000	97,5	2,5	437.500	0	437.500	Check cleaning practises
2	City water	74.568 [m³]	74.568	0	100	74.568	74.568	149.136	Better controlling, automatisation
3	Well water	100.00 [m³]	0	0	100	0	100.000	100.000	Better controlling, automatisation
4	Packaging film	400 [t]	800.000	80	20	160.000	28.000	188.000	Check setup procedure
5	Cleaning agents	7.120 [kg]	14.240	0	100	14.240	0	14.240	Check cleaning
6	Disinfectants	15.202 [kg]	76.000	0	100	76.000	0	76.000	Check cleaning
7	R22	110 [kg]	1320	0	100	1320	0	1320	Replacement legal requirement
8	Electricity	7 [GWh]	700.000	0	100	700.000	0	700.000	Check cooling efficiency
9	Natural gas	3.000.000 [sm³][1]	105.000	0	100	105.000	0	105.000	Check heat consumption
10									
11									

[1] 1 sm³ is 11 kWh

PRESOURCE Use the EDIT VALUE Tool

3. MANAGEMENT SYSTEM

3.4 Are there significant environmental aspects? Is there an effectively operated environmental management system in place?

NA	Absence	Preparation	Integration	Proaction	WEIGHT
0	**No EMS**	EMS is being prepared	EMS is implemented	EMS is effectively implemented (goals for different aspects are defined and progress is monitored)	A B C
	1	2	3	4	
S_{cur}	Int				
R_{em}	For evaluation of **WEIGHT** the following approach is recommended: A – very important should be given to an enterprise with significant environmental impacts; B – medium importance with medium importance of environmental impacts; C – low importance for low importance environmental impacts				

APPLICATIONS

EMAS
EMAS easy
ISO 14001

PRESOURCE

5. PROCESSES

5.2 Management of potential to increase energy efficiency					
NA	**Absence**	**Preparation**	**Integration**	**Proaction**	**WEIGHT**
0	No data available	**Documentation of energy consumption, (some) energy reduction measures**	regular energy audits (internal or external), documentation of energy consumption, benchmarking, good maintenance and training activities, action plan	Monitoring and controlling of energy efficiency data, energy action plan, energy team, energy report,	A B C
	1	2	3	4	
S_{our}	1.2 (input/output tables)				
R_{em}					
APPLICATIONS					
Energy Audit (ISO 16247) Energy saving checklists					

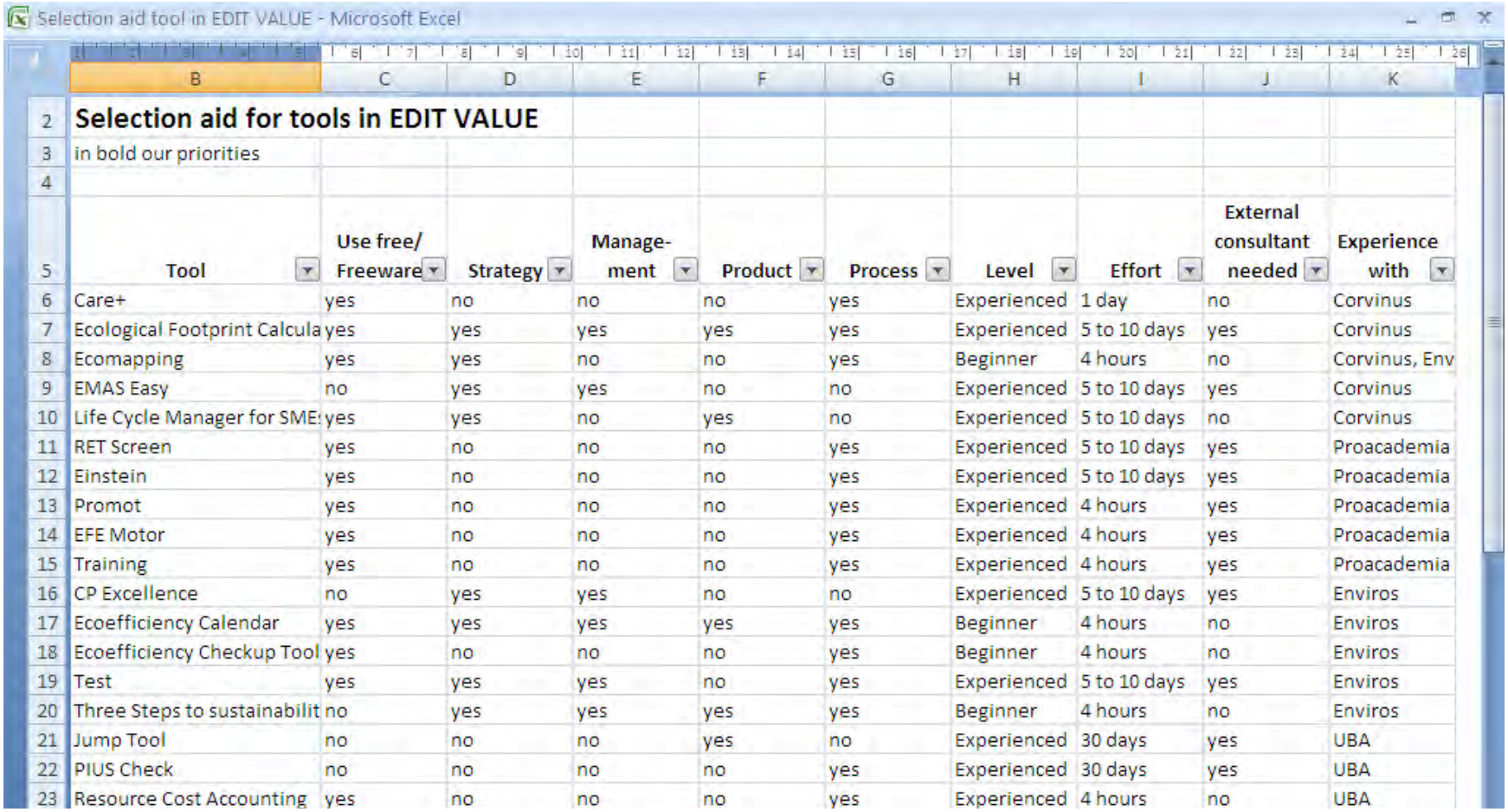
PRESOURCE

5.5 Control of processes and equipment					
NA	Absence	Preparation	Integration	Proaction	WEIGHT
0	Fully manual control by operators	Partly electronic control built into machines	Data acquisition, logging, automatic control cycles	Data acquisition, logging, parameter optimisation, evaluation, training	A B C
	1	2	3	4	
Sou	Interview				
Rem					
APPLICATIONS KPI, monitoring and controlling Training plan Process data acquisition system					

PRESOURCE

5.11 Water management					
NA	Absence	Preparation	Integration	Proaction	WEIGHT
0	No specific analysis or measures	**Sources of water consumption known, some measures implemented**	A number of water efficiency measures implemented in process and utilities, regular water monitoring and controlling, separation of waste water, recycling of water	A system for managing water efficiency within important cost centres; all documented measures implemented for: - cooling - cleaning - rinsing - transport Action plan including goals	A B C
	1	2	3	4	
Sour	Interview Sector (question) Technologies used (question) Input/output tables				
Ran					
APPLICATIONS Water audit using checklists for: - cooling - cleaning - rinsing - transport Cleaner Production Assessment PRESME Toolkit					

PRESOURCE Selection tool


Selection aid tool in EDIT VALUE - Microsoft Excel

Selection aid for tools in EDIT VALUE

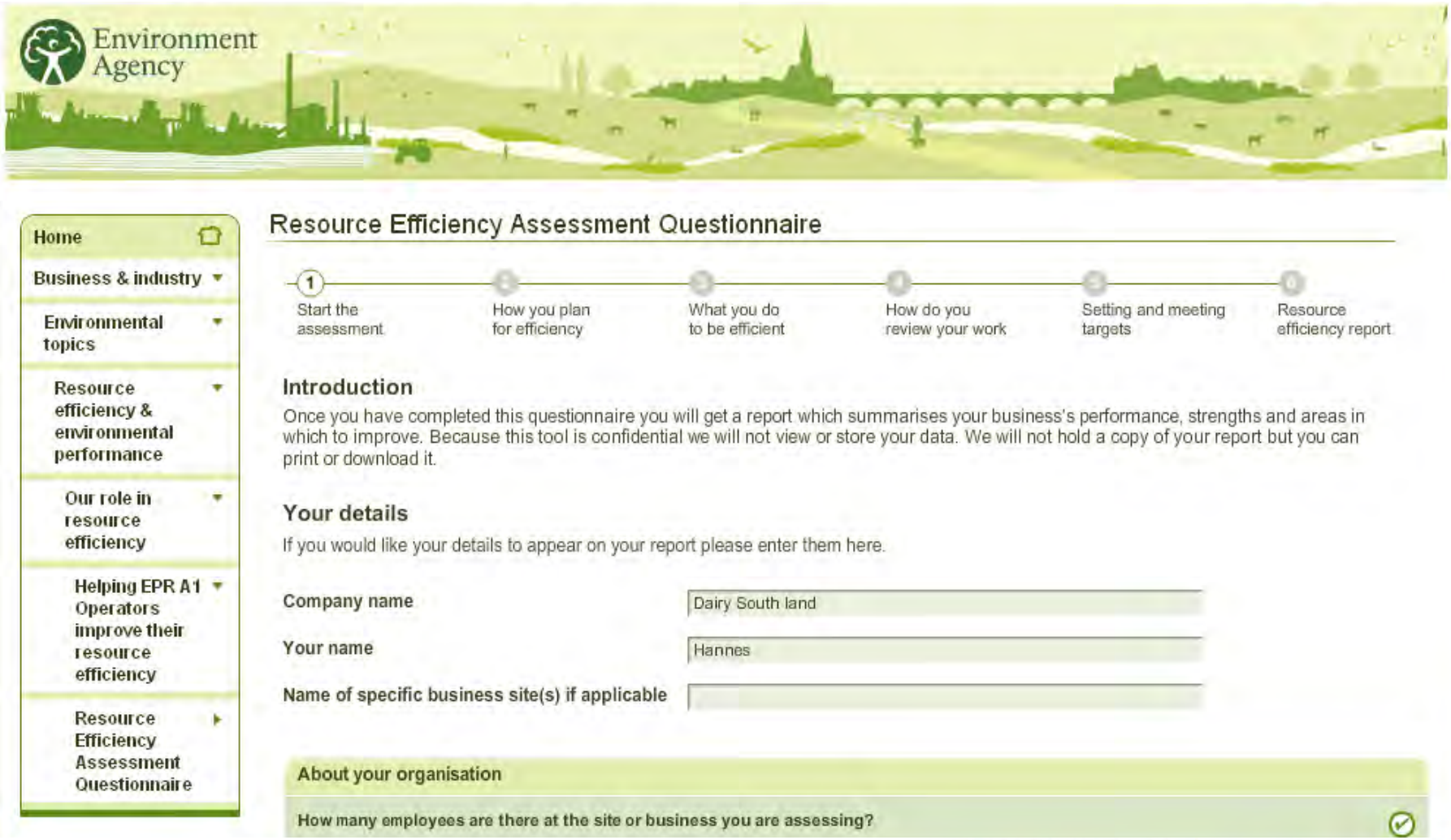
in bold our priorities

Tool	Use free/ Freeware	Strategy	Manage-ment	Product	Process	Level	Effort	External consultant needed	Experience with
Care+	yes	no	no	no	yes	Experienced	1 day	no	Corvinus
Ecological Footprint Calcula	yes	yes	yes	yes	yes	Experienced	5 to 10 days	yes	Corvinus
Ecomapping	yes	yes	no	no	yes	Beginner	4 hours	no	Corvinus, Env
EMAS Easy	no	yes	yes	no	no	Experienced	5 to 10 days	yes	Corvinus
Life Cycle Manager for SME:	yes	yes	no	yes	no	Experienced	5 to 10 days	no	Corvinus
RET Screen	yes	no	no	no	yes	Experienced	5 to 10 days	yes	Proacademia
Einstein	yes	no	no	no	yes	Experienced	5 to 10 days	yes	Proacademia
Promot	yes	no	no	no	yes	Experienced	4 hours	yes	Proacademia
EFE Motor	yes	no	no	no	yes	Experienced	4 hours	yes	Proacademia
Training	yes	no	no	no	yes	Experienced	4 hours	yes	Proacademia
CP Excellence	no	yes	yes	no	no	Experienced	5 to 10 days	yes	Enviros
Ecoefficiency Calendar	yes	yes	yes	yes	yes	Beginner	4 hours	no	Enviros
Ecoefficiency Checkup Tool	yes	no	no	no	yes	Beginner	4 hours	no	Enviros
Test	yes	yes	yes	no	yes	Experienced	5 to 10 days	yes	Enviros
Three Steps to sustainabilit	no	yes	yes	yes	yes	Beginner	4 hours	no	Enviros
Jump Tool	no	no	no	yes	no	Experienced	30 days	yes	UBA
PIUS Check	no	no	no	no	yes	Experienced	30 days	yes	UBA
Resource Cost Accounting	yes	no	no	no	yes	Experienced	4 hours	no	UBA

PRESOURCE Suggested tool: Cleaner Production

- READ Tool:
  http://www.environment-agency.gov.uk/static/documents/Business/Resource_Efficiency_Tool_guide_for_EPRA1_customers.pdf
- PRESME Tool
  (estimated time to check about 4 hours)
- Ecoprofit
  (most effective in group, 5 to 15 working days)
- PIUS Check
  (with external consultant, 30 working days)

PRESOURCE Example of application



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- You may need to put short term/low cost measures in place in order to make progress.

Waste – ★★★★★★

Expenditure

- At present, waste costs around £100000 per annum. Your spending is constant.

Knowledge and understanding

- You understand some of your waste production well and have measured some of your waste production.
- Your measurement is moderately accurate.

Achieving targets and improving performance

- Senior managers periodically review waste use.
- There are targets across most of the operation to manage waste use.
- Targets are partly based on technical or historical benchmarks.
- Waste use targets are sometimes achieved.
- Apparently there is more opportunity to increase efficiency in this area.
- You may need to put short term/low cost measures in place in order to make progress.

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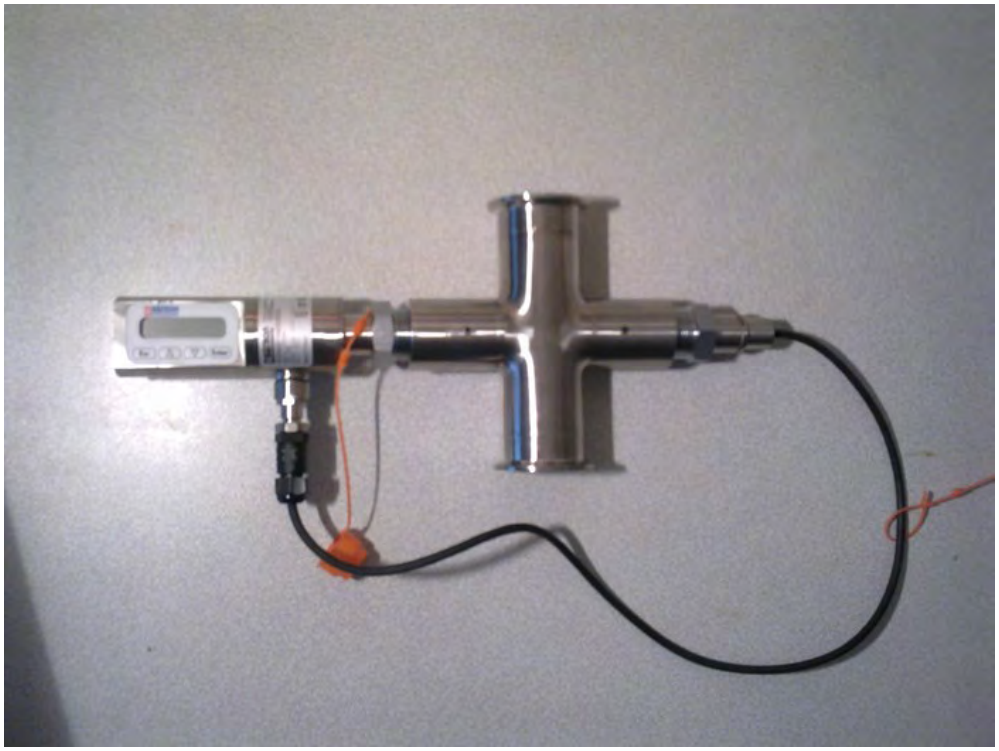
PRESOURCE Sector specific checklist (PRESME)

- Use continuous rather than batch processes to reduce the frequency of cleaning;
- Use automated cleaning-in-place (CIP) systems for cleaning to control and optimise water use;
- Install fixtures that restrict or control the flow of water for manual cleaning processes;
- Use high pressure rather than high volume for cleaning surfaces;
- Reuse relatively clean wastewaters (such as those from final rinses) for other cleaning steps or in non-critical applications;
- Recirculate water used in non-critical applications;
- Install meters on high-use equipment to monitor consumption;
- Pre-soak floors and equipment to loosen dirt before the final clean;
- Use compressed air instead of water where appropriate;
- Report and fix leaks promptly.

Probes for upgrading CIP plant



Proposal for upgrade of CIP plant

- 4 probes at 10.000 Euros
- 1 additional tank 15.000 Euros
- Pipes etc. 15.000 Euros
- Control unit 15.000 Euros
- Project costs, civil works, installation, startup 65.000 Euros

Suggested Tool: EMS

- EMAS
- ISO 14001

PRESOURCE

Example of application

I

(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)

REGULATIONS

REGULATION (EC) No 1221/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 25 November 2009

on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee (1),

development of initiatives to encourage organisations to publish rigorous and independently verified environmental or sustainable development performance reports is regarded as necessary in this context.

(3) The Commission Communication of 30 April 2007 on the Mid-term review of the Sixth Community Environment Action Programme recognises that there is a need to improve the functioning of the voluntary instruments that

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ANNEX I

ENVIRONMENTAL REVIEW

e environmental review shall cover the following areas:

Identification of the applicable legal requirements relating to the environment.

In addition to the establishment of a list of applicable legal requirements, the organisation shall also indicate how evidence that it is complying with the different requirements can be provided.

Identification of all direct and indirect environmental aspects with a significant impact on the environment, qualified and quantified as appropriate and compiling a register of those identified as significant;

An organisation shall consider the following issues in assessing the significance of an environmental aspect:

(i) potential to cause environmental harm;

(ii) fragility of the local, regional or global environment;

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Suggested Tool: Ecodesign

- Ecolizer http://www.ecodesignlink.be/en/ecolizer
- Life Cycle design manager http://www.unep.fr/scp/lcinitiative/publications/training/lcmnavigator/index_c.html

PRESOURCE Example of application

Bioplastics 03.14

PRODUCTION	mPt/kg
Modified starch/kg	275
Polylactide (PLA)/kg	312

PROCESSING	mPt
Revolving, milling, drilling/cm³	0,01 (!)
Extrusion, plastic film/kg	49
Extrusion, plastic pipes/kg	36 (!)
Hot element welding (30sec)/welding	2 (!)
Hot element welding (45min)/welding	155 (!)
Blow moulding/kg	123 (!)
Laser welding/m	0,46 (!)
Foaming/kg	60 (!)
Reaction injection moulding (RIM), large scale/kg	21 (!)
Rotation Forming/kg	106 (!)
Mirror-welding	dna
Injection moulding/kg	126 (!)
Ultrasonic welding (15kHz)/welding*	0,04 (!)
Ultrasonic welding (20kHz)/welding*	0,02 (!)
Ultrasonic welding (40kHz)/welding*	0,01 (!)
=51&zoom=170,17,655 ...g/kg	dna

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Biopolymer bags

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PRESOURCE Options……

- Train employees …
- Check feasibility of CIP plant …
- Introduce EMS …
- Check feasibility of bioplastics …

Feasibility analysis

- Technical feasibility
- Ecological feasibility
- Economic feasibility

Technical feasibility

- Impact on quality
- Impact on productivity
- Impact on materials consumption
- Impact on energy consumption
- Maintainance
- Safety
- Flexibility
- Availability of space and infrastructure

Ecological feasibility

- Resource efficiency
- Shift of problems
- Emissions
- Health and safety
- Replacement of substances
- …

Economic feasibility

- Payback period
- Consider
  - Obvious environmental cost
  - Cost of materials and energy
  - Personnel
  - Services
  - Investment and depreciation
  - maintenance

CIP plant

- 4 turbidity probes at 10.000 Euros
- 1 additional tank 15.000 Euros
- Pipes etc. 15.000 Euros
- Control unit 15.000 Euros
- Project costs, civil works, installation, startup 65.000 Euros

Technical feasibility

- Impact on quality
- Impact on productivity
- Impact on materials consumption
- Impact on energy consumption
- Maintainance
- Safety
- Flexibility
- Availability of space and infrastructure

Technical feasibility

- Resource efficiency 
- Shift of problems 
- Emissions 
- Health and safety 
- Replacement of substances n. r. 

Economic feasibility

- Investment 120.000 €
- Operating cost savings 50% water (125.000 €)
- Maintenance low

Action plan

Activity	Responsible	Due date	Budget	Status
Upgrade of CIP plant	Ms Clean	October 2014	120.000 €	☺

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Thank you for your active participation!