

Importance of co-benefits and how these can be measured

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Presentation

- Lokalenergi
 - Electricity sales
 - Consultancy services
 - All customers segments
 - All types of energy
 - Energy labelling of buildings
 - National auditor of building energy labels
 - ESCO projects
 - Management systems
- Research within energy optimization
- Erik - Director of Lokalenergi
- Working with energy in all segments during the last 25 years
 - On all levels from high level planning to the household sector
- Certified energy consultant in industry by DEA
- Member of energy efficiency working groups
- Specialist in the "marketing" of energy efficiency



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The Danish association of engineers has made a survey in 2006 it concludes:

- In industry and production companies in DK there are the following savings potentials:
- 10-15% with a pay back up to 4 year
- 40% with a pay back up to 6-7 years

The energy price equals 50 USD pr. barrel, the survey does not include the value of non-energy benefits (NEBs). The survey concludes that the main reason for not implementing is that the energy efficiency proposals do not fulfil the requirements of the industry sector.

However assessment of individual projects points out that the value of NEBs often is in the size of **2.5 to 3 times higher** than the value of the energy efficiency projects

So the above potentials are transformed into this:

- **10-15% with a pay back up 1.6 year**
- **40% with a pay back up to 2.4-2.8 years**
- **If the NEB value is set to 2.5**

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Cases all connected to EMS

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Case productivity – feedstuff company

- **Production of cattle food**
 - Soy meal, grain products, and other products are mixed
 - Grinded
 - Steam and other fluids are added
 - Passes an expander
 - The mix passes through a pellet plant
- **Energy consumption 5.9 GWh**
- **Traditional energy efficiency proposals**
 - Motors drive systems etc
 - Saving potential: 300-450 MWh

Mixing process

Grinding

Humidifier

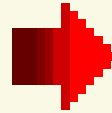
Pelleting

Case productivity – food-stuff company

- However, focus on the production resulted in
- Production 12 t/h, designed for 20 t/h
 - Spec. 7.9 kWh/t
- By increased steam production, production could be increased to 15 t/h
 - Spec. 5.4 kWh/t
- By increasing the size of the motor of the pelleting mill from 50 kW to
- 250 kW the production was increased to 17 t/h
 - Spec. 2.9 kWh/t
- Energy saving 795 MWh
- Payback, only focus on energy, 4.2 year, with production improvement
- less than 1 year

Traditional Trout Farm → Going through technological changes

Traditional Trout Farm



Model Trout Farm



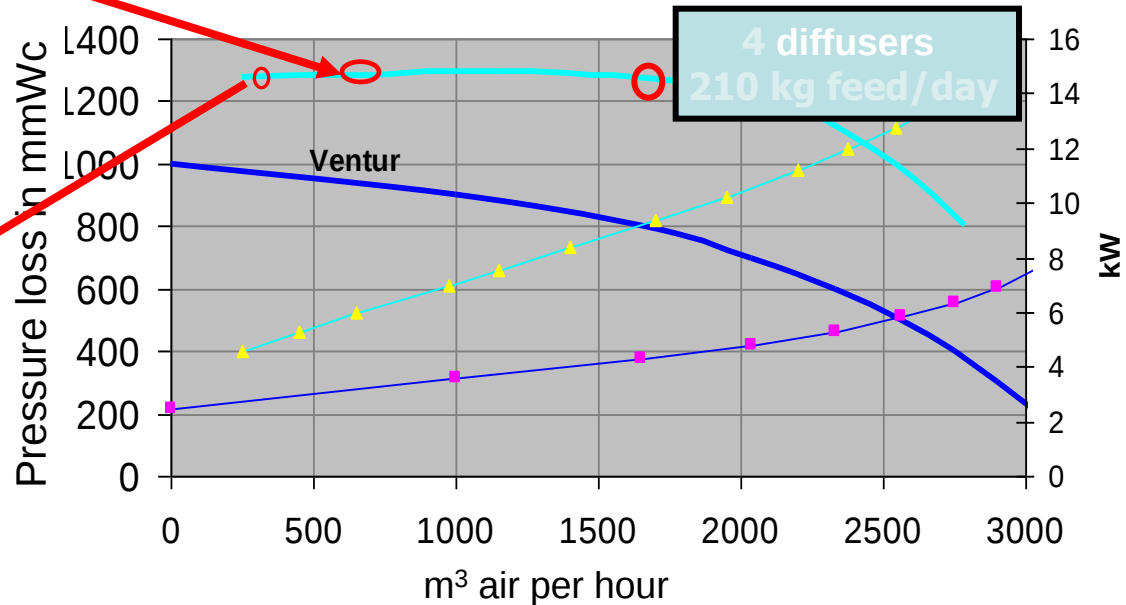
Environment: Restricted feed quotas, restriction on water intake from the water course, EU's Water Frame Directive, competition from areas with lower labour costs

Increase in production

Energy optimum design – a question of feed digestion!!

1 optimal diffuser
50 kg feed/day

Blower capacity related to pressure



1 diffuser
20 kg feed/day

Production of liquid gasses

- If the temperature of the cooling water goes up it has a great influence on the energy consumption in the production of liquid gasses.
- Systematic metering introduced in connection with the implementation of EMS, indicated rising temp over time, due to smudge of the heatexchanger.
- In spite of chemical treatment of the cooling water.
- What to do ?
- Special investigation pointed towards an ozone unit together with a sand filter
- Result temp decreased with 1-2 degrees

Production of liquid gasses

- Savings -energy:
 - 153.000 kWh/year or 12.000 US dollar
- Payback 3.6 years



However !

- other savings :
 - Chemicals 50.000 US dollar/year
 - Corrosion inhibitorer 12.000 US dollar/year
 - Reduced corrosion 20.000 US dollar/year
 - Reduced labour cost
 - Reduced down time
 - Reduced enviromental influence
 - Better working enviroment

What are NEBs

Non-energy benefits from efficiency improvements

Waste	Emissions	Operation and maintenance
Use of waste fuels, heat, gas	Reduced dust emissions	Reduced need for engineering controls
Reduced product waste	Reduced CO, CO ₂ , NO _x , SO _x emissions	Lowered cooling requirements
Reduced waste water		Increased facility reliability
Reduced hazardous waste		Reduced wear and tear on equipment/machinery
Materials reduction		Reductions in labor requirements
Production	Working environment	Other
Increased product output/yields	Reduced need for personal protective equipment	Decreased liability
Improved equipment performance	Improved lighting	Improved public image
Shorter process cycle times	Reduced noise levels	Delaying or Reducing capital expenditures
Improved product quality/purity	Improved temperature control	Additional space
Increased reliability in production	Improved air quality	Improved worker morale

Ref. *E. Worrell*

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How can they be assessed?

- Use the values from research 2.5
- Questionnaire
- Exact calculation

How can they be assessed ?

2

- Questionnaire
 - Change, with positive value
 - Change, with negative value
 - Change, don't know value

How can they be assessed ?

3

- Calculation
 - Identify and describe the benefits associated with a given measure
 - Quantify the impacts
 - Convert the impacts into money

????????

Many thanks for listening

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