



Halsnæs
Kommune

Business Models for Deep Energy Retrofit in Buildings and Communities

EPC- Project Experience From the Municipality of Halsnæs

Annex 61

Aalborg University, Copenhagen March 17, 2014

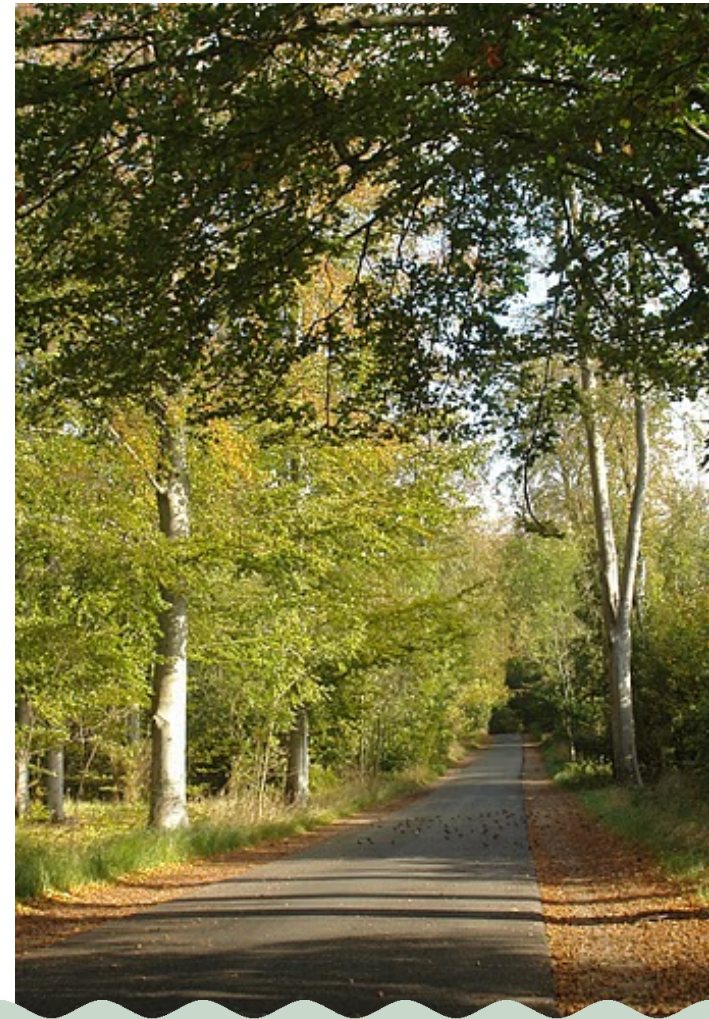
*Jens N. Jørgensen
Energy Engineer
Municipality of Halsnæs*

*Redelighed
Helhed
Mulighed*

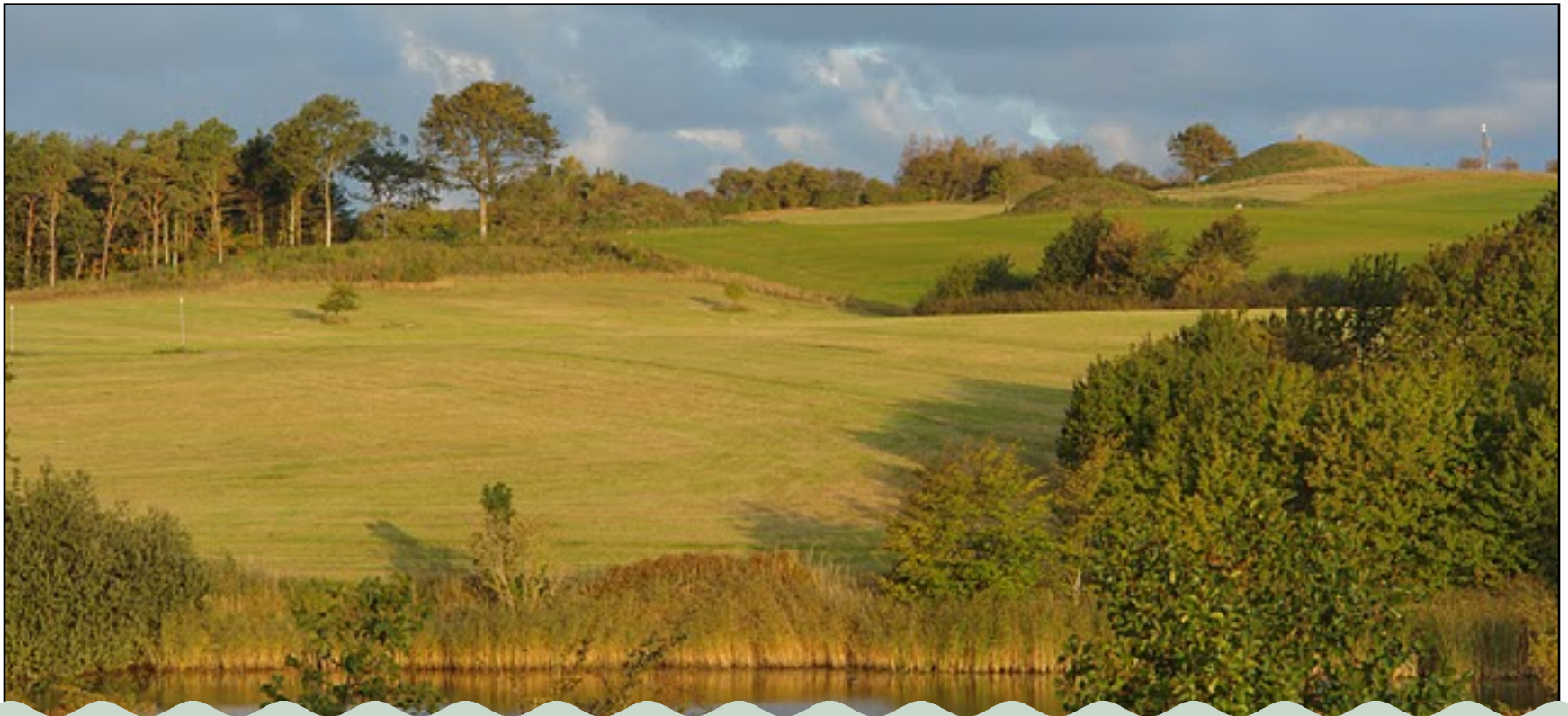
EPC- Project Experience

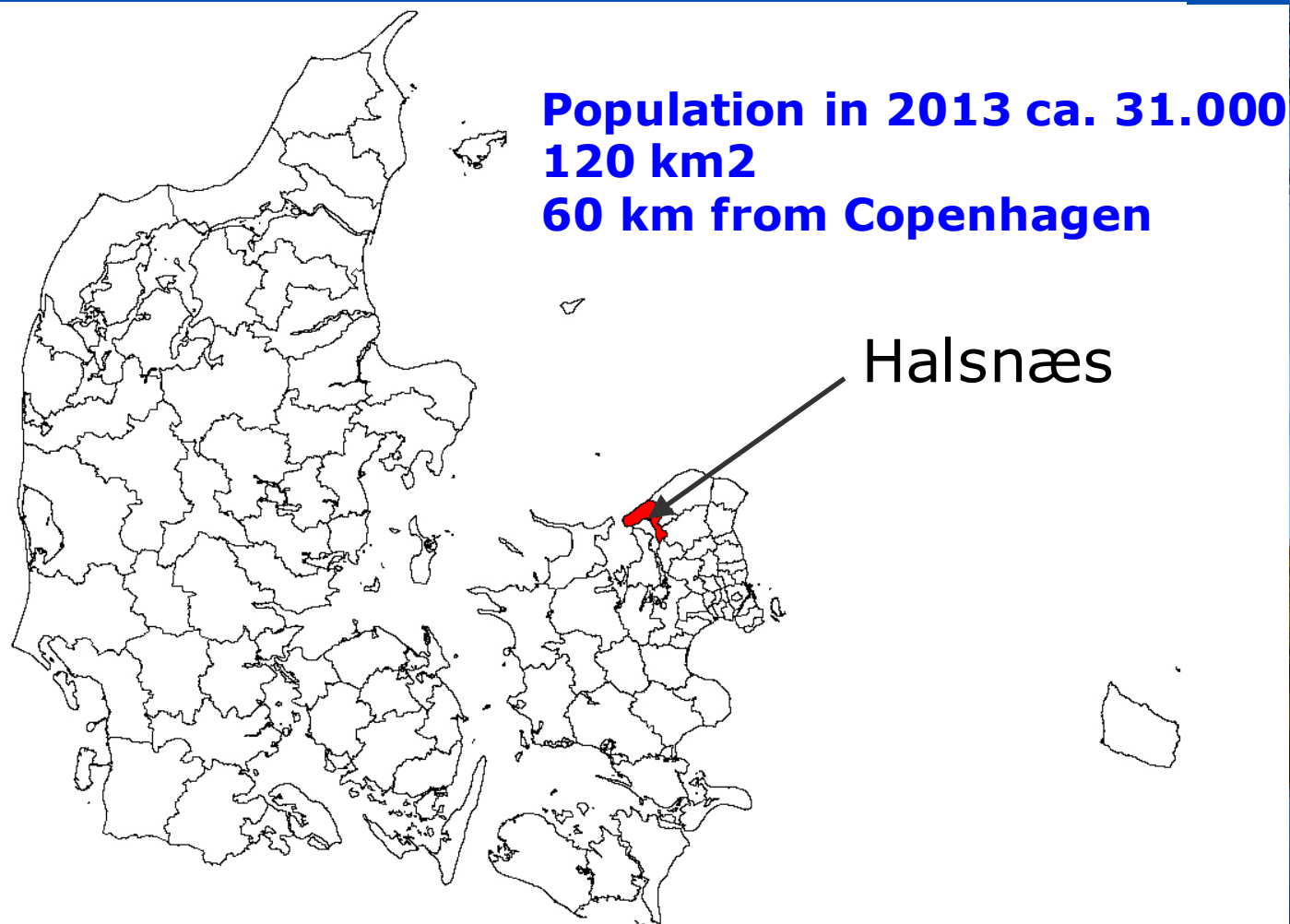
- The Municipality of Halsnæs
- EPC Project (ESCO) Background
- Procurement and Implementation Process
- Lessons Learned

Q & A



The Municipality of Halsnæs





Why EPC (ESCO)?

- Environment (climate agreements)
- Maintenance backlog
- Agreement between the Government and the Local Government Denmark (KL) on implementing energy saving measures in municipalities
- Financing
- Guarantee



Why EPC (ESCO)?....cont.

- Self funding; energy savings fund building upgrades
- No need for additional personnel
- The ESCO guarantee relieves the municipality of economic risk
- All costs for implementing and monitoring are covered
- Common incentive to save even more



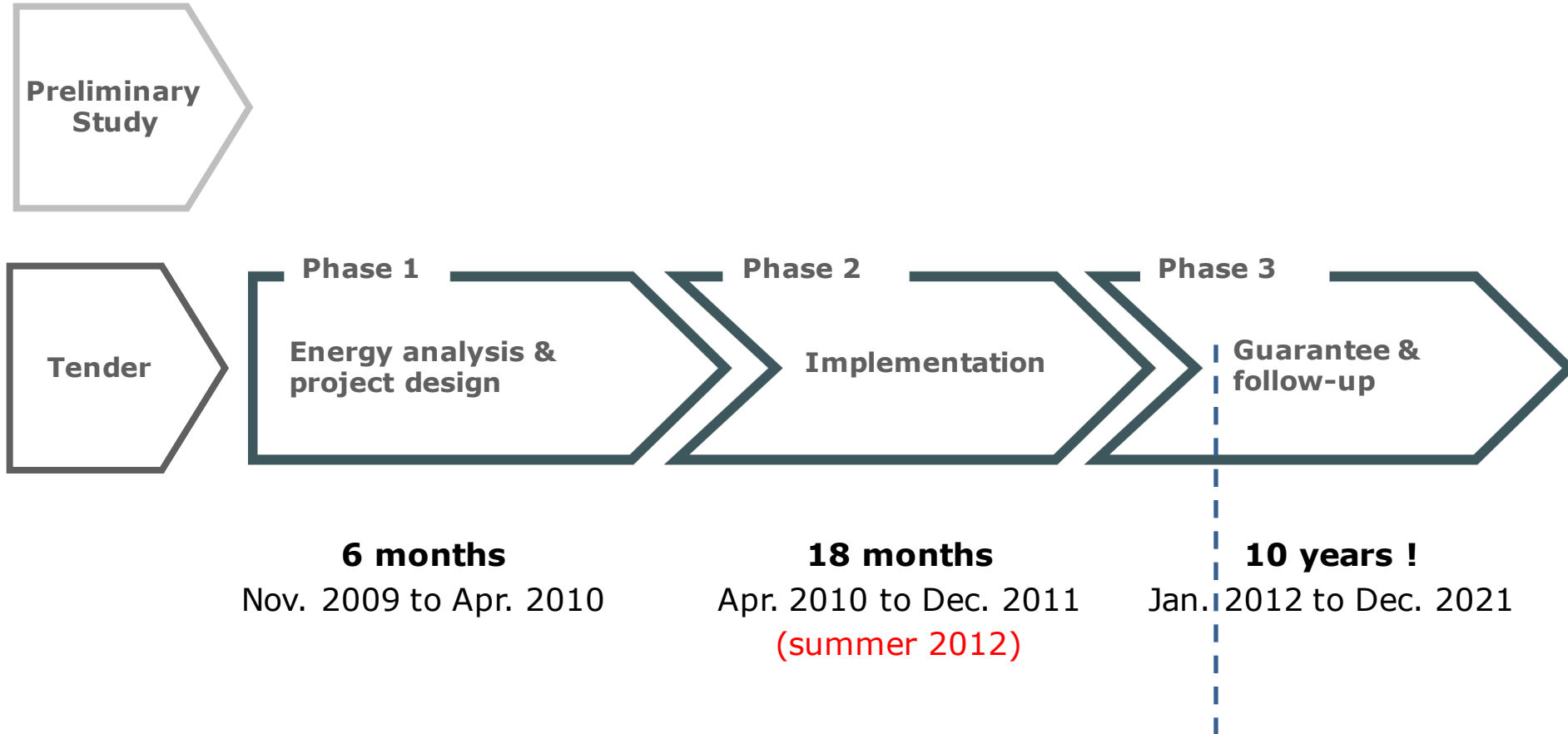
Why EPC (ESCO)?.....cont.

Effects:

- Reduced energy costs
- Decrease in carbon emissions
- Reduced backlog
- Energy management (monitoring) until 2021
- Motivation for more energy reduction
- Training/increased competences of the maintenance crew
- Jobs for locally based companies



Phases & Status



Tender Conditions

- ✓ 20% guaranteed energy savings (electricity and heating)
- ✓ 10% electricity savings
- ✓ 15% heating savings
- ✓ 15% of savings from renewable energy
- ✓ 35% of savings from refurbishment or replacement of building enclosures
- ✓ Minimum 2/3 share of over performance to Halsnæs Municipality
- ✓ Demand guarantee of 25% valued energy savings over 15 years
- ✓ 5 years product guarantee
- ✓ Training of maintenance crew

Guaranteed Savings

Winning bid from YIT

Parameter	
Electricity	28,5 %
Heating	30,7 %
Halsnæs Municipality's share of savings exceeding guaranteed savings	2/3

Investment and Expected Savings



Project sum	Phase 1 + 3	Implementation
91,4 m DKK	4,87 m DKK	86,5 m DKK
Expected annual savings: 6,2 m DKK		
15 years pay back period		

Project Organisation

- **Steering Committee**
- **Project Team**
- **Stakeholders**



Renewables

	Extent	Expected annual production
Solar cells	14 locations 3.452 m²	444.100 kWh
Solar panels	13 locations 440 m²	228 MWh
Geothermal heat pumps	4 locations 6.600 m²	495 MWh <i>Electricity consumption 138 MWh</i>
In addition:		
<ul style="list-style-type: none"> • 23 heat pumps (air/air or air/water) • 1 mini power station (gas) • 1 small wind turbine (test) 		



Light House Project; Renewables



Initiative	Investment	Expected annual production/savings
Wind turbine	80.000 DKK Simple PB (test)	2.000 kWh, 2.800 DKK
20m ² solar panels Frederiksværk Sports Hall	150.000 DKK Simple PB 11 yrs.	9.900 kWh, 13.900 DKK
28m ² solar panels Magleblik School	245.000 DKK Simple PB 16 yrs.	7.140 kWh, 15.000 DKK
450 m ² solar cells, ground mounted	1.691.000 DKK Simple PB 19 yrs.	62.650 kWh, 87.700 DKK
Geothermal heat pump	1.150.000 DKK Simple PB 15 yrs.	441.000 kWh, 76.000 DKK (+126.00 kWh el)
255 m ² solar panels ground mounted	1.700.000 DKK Simple PB 24 yrs.	123.000 kWh, 70.500 DKK
Mechanical room	600.000 DKK	0
Sum	5.616.000 DKK Simple PB 21 yrs.	265.900 DKK pr. year

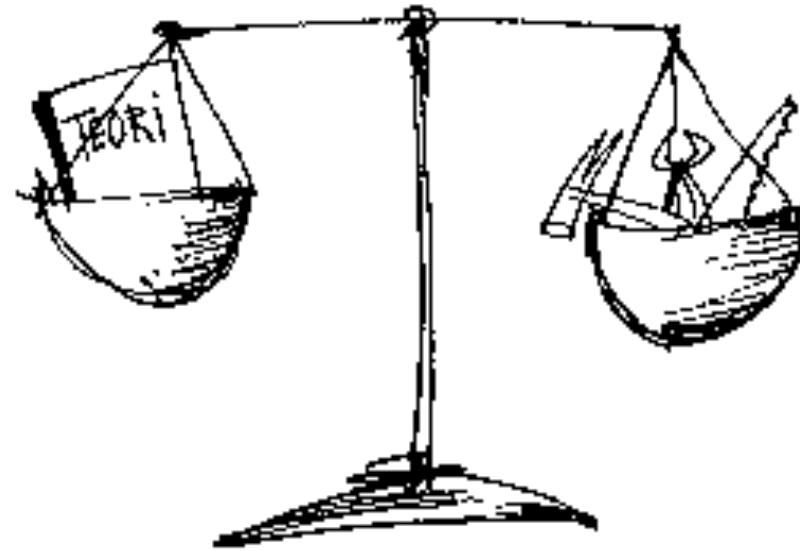
Lessons Learned- Preliminary Studies

- Shoot for the moon...
- You can't always know what decision makers think; politicians as well as top management
Ask them!
- Make the burning platform visible
- Remember to communicate the downsides
- Get support from top management
Build a good foundation!



Lessons Learned - Tender Process

- Legal & Technical advice
- Client costs for consultants & internal project management overhead are included in the bid
- Tender conditions should reflect project purpose and visions
- Coping with project changes
- Baseline issues
- Calculating over/under performance
- Tender requirements should challenge bidders;
just not too much!



Lessons Learned - Analysis phase

- Gathering baseline information is time consuming
- Focus on tasks in phase 2 & 3 while preparing project tools (ex spreadsheets)
- ALL initiatives expected to be implemented **SHOULD** be described and allocated at building level
- Planning of implementation process (phase 2)



Lessons Learned - Guarantee Phase

- ➔ Follow-up process & energy management
- ➔ Steering committee
maintain focus on the project
- ➔ Involve maintenance crew
- ➔ Baseline adjustment;
who, how, when?

ESCO Halsnæs



#31 Ølsted Børnehus

Periode 1. januar 2012 til den 31. januar 2012



Energibesparelse:

11,622 MWh (varme)
12,560 MWh (el + varme)

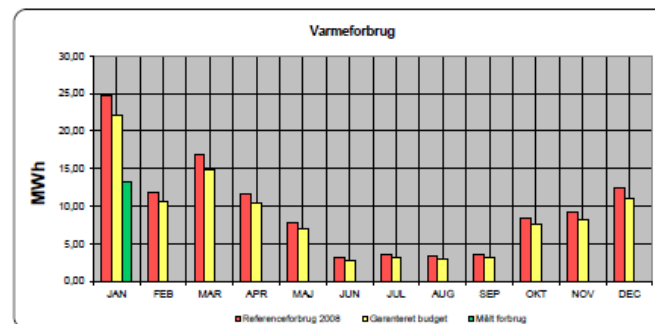


CO2 reduktion

2,441 Ton CO2 (varme)
2,864 ton CO2 (el + varme)

Varmeforbrug - MWh - på månedsbasis

Periode	Forbrug før ESCO Ref. 2008	Målt Forbrug Indev. År	Garanteret Forbrug	Besparelse MWh	Besparelse MWh	Besparelse % af MWh	Besparelse over/under præstation % af MWh	Besparelse Ton CO2
JAN	24,77	13,15	22,03	11,62	2,74	46,92%	35,85%	2,44
FEB	11,86	0,00	10,55	0,00	1,31	0,00%	0,00%	0,00
MAR	16,80	0,00	14,94	0,00	1,86	0,00%	0,00%	0,00
APR	11,66	0,00	10,37	0,00	1,29	0,00%	0,00%	0,00
MAJ	7,75	0,00	6,90	0,00	0,86	0,00%	0,00%	0,00
JUN	3,20	0,00	2,85	0,00	0,35	0,00%	0,00%	0,00
JUL	3,50	0,00	3,11	0,00	0,39	0,00%	0,00%	0,00
AUG	3,30	0,00	2,93	0,00	0,37	0,00%	0,00%	0,00
SEP	3,57	0,00	3,17	0,00	0,39	0,00%	0,00%	0,00
OKT	8,48	0,00	7,54	0,00	0,94	0,00%	0,00%	0,00
NOV	9,24	0,00	8,22	0,00	1,02	0,00%	0,00%	0,00
DEC	12,40	0,00	11,03	0,00	1,37	0,00%	0,00%	0,00
År til dato	116,53	13,15	103,63	11,6	12,90	0,00%	7,62%	2,44



Questions ?

