FME HighEFF

Centre for an Energy Efficient and Competitive Industry for the Future

Deliverable D3.1_2019.04 & D4.2_2019.03
Practical heat-to-power conversion

Delivery date: 2019-11-05

Organisation name of lead beneficiary for this deliverable:

SINTEF Energy Research

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RE	Restricted to a group specified by the consortium	
INT	Internal (restricted to consortium partners only)	

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Action	Performed by	Date
Verified (WP leader)	Trond Andresen	2019-11-05
Reviewed (RA leader)	Trond Andresen	2019-11-05
Approved (dependent on nature of deliverable)*)		

*) *The quality assurance and approval of HighEFF deliverables and publications have to follow the established procedure. The procedure can be found in the HighEFF eRoom in the folder "Administrative > Procedures".*

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Abstract

The HighEFF reference group *Energy Recovery* hosted a technical workshop "Practical vs. Academic Approach to Energy Recovery" in Trondheim 2019-10-22.

This deliverable documents agenda, participants and links to all presentations from the meeting.

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Norges forskningsråd

Practical vs. Academic approach to Energy Recovery

HighEFF ER Workshop
Trondheim 2019-10-22

Agenda with links to presentations

Time	Title	Presenter
09:00	Welcome/HSE	Vidar Skjervold, SINTEF Energi
09:15	Introduction – theme of the day	Trond Andresen, SINTEF Energi
09:30	Finnfjord's practical experiences with energy recovery	Morten Bakketun, Finnfjord
10:00	Coffee break	
10:15	Controlling flue gas temperatures in silicon furnaces	Balram Panjwani, SINTEF Industry
10:45	Mitigation of furnace dynamics	Daniel Rohde, SINTEF Energi
11:30	Lunch	
12:30	Elkem's practical experiences with energy recovery	Paul Wilpert, Elkem
13:00	Academic analysis of improvement potential at Elkem Thamshavn	Monika Nikolaisen, SINTEF Energi
13:30	Break	
13:45	Novel heat recovery concept	Vidar Skjervold, SINTEF Energi
14:15	Thermo-mechanical fatigue of components exposed to pressure and temperature variations	Marcin Pilarczyk, NTNU
14:35	Summary/discussion	Petter Nekså, SINTEF Energi
15:00	End of day	

Trouble with direct links? Open eRoom folder in web browser:
https://project.sintef.no/eRoom/energy2/HighEFF/0_3936b

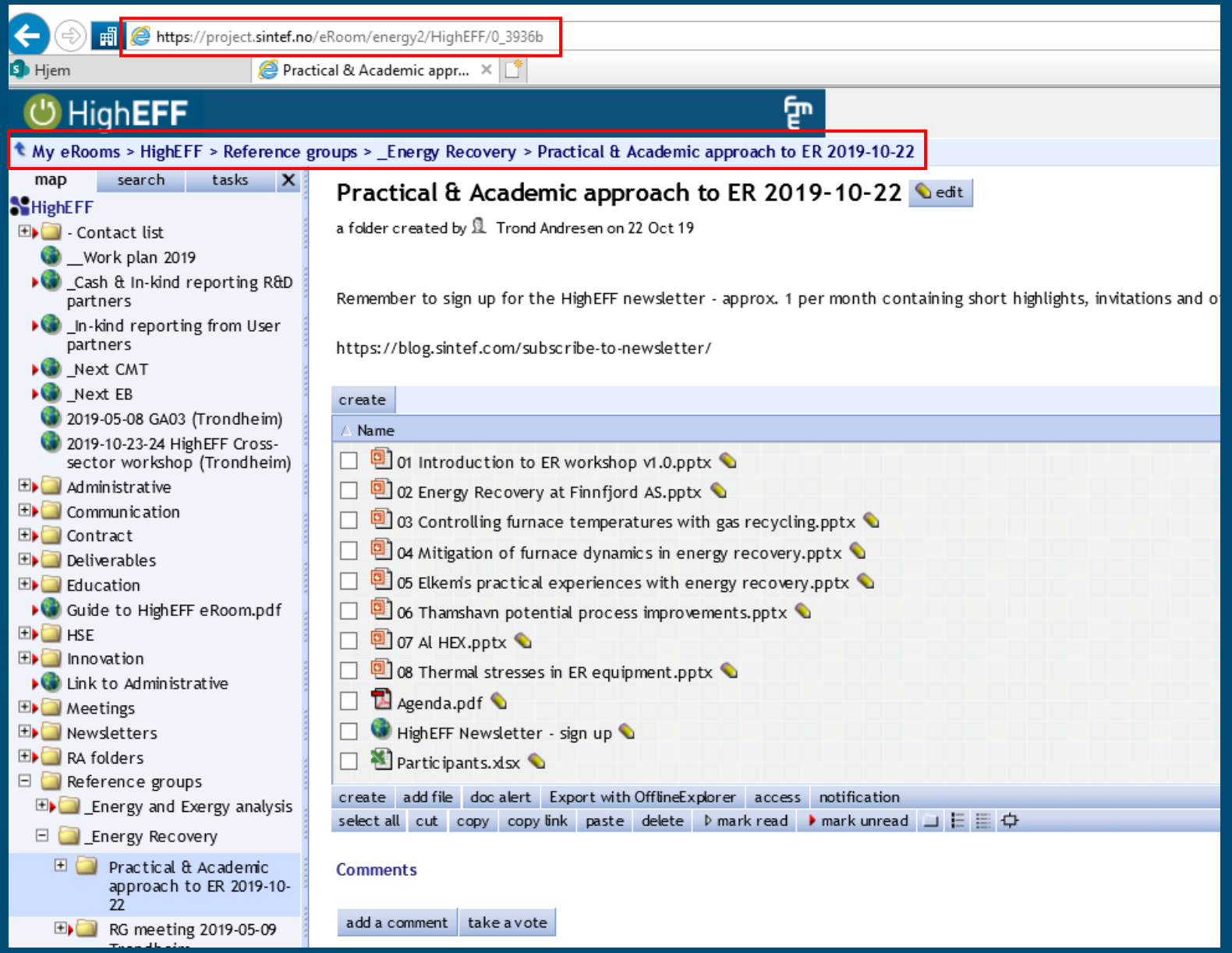
Participants

Company	Last name	First name	Presenter	Comment
Alcoa	Grimstad	Martin		
Alfalaval	Nilsson	Mats		
Elkem	Wilpert	Paul	5	
Equinor	Bindingsbø	Ulrik		
Equinor	Thuestad	Lars		
Eramet	Kadkhodabeigi	Mehdi		
Eramet	Ravary	Benjamin		
Finnfjord	Bakketun	Morten	2	
GE Power	Sørhuus	Anders		(Skype)
Hydro	Holt	Nancy Jorunn		(Skype)
Hydro	Moxnes	Bjørn Petter		

Company	Last name	First name	Presenter	Comment
KTH	Lundquist	Per G.		
KTH	Shahrooz	Mina		(PhD)
NTNU	Agromayor	Roberto		(PhD)
NTNU	Gundersen	Truls		
NTNU	Hagen	Brede		(PhD)
NTNU	Pilarczyk	Marcin	8	(PhD)
NTNU	Zotica	Cristina		(PhD)
SINTEF ER	Andresen	Trond	1	
SINTEF ER	Durakovic	Goran		
SINTEF ER	Foslie	Sverre		
SINTEF ER	Nekså	Petter		
SINTEF ER	Nikolaisen	Monika	6	
SINTEF ER	Rohde	Daniel	4	
SINTEF ER	Sevault	Alexis		
SINTEF ER	Skaugen	Geir		
SINTEF ER	Skjervold	Vidar	7	
SINTEF I	Panjwani	Balram	3	
SINTEF I	Pettersen	Torbjørn		

https://project.sintef.no/eRoom/energy2/HighEFF/0_3936b

All presentations in HighEFF eRoom



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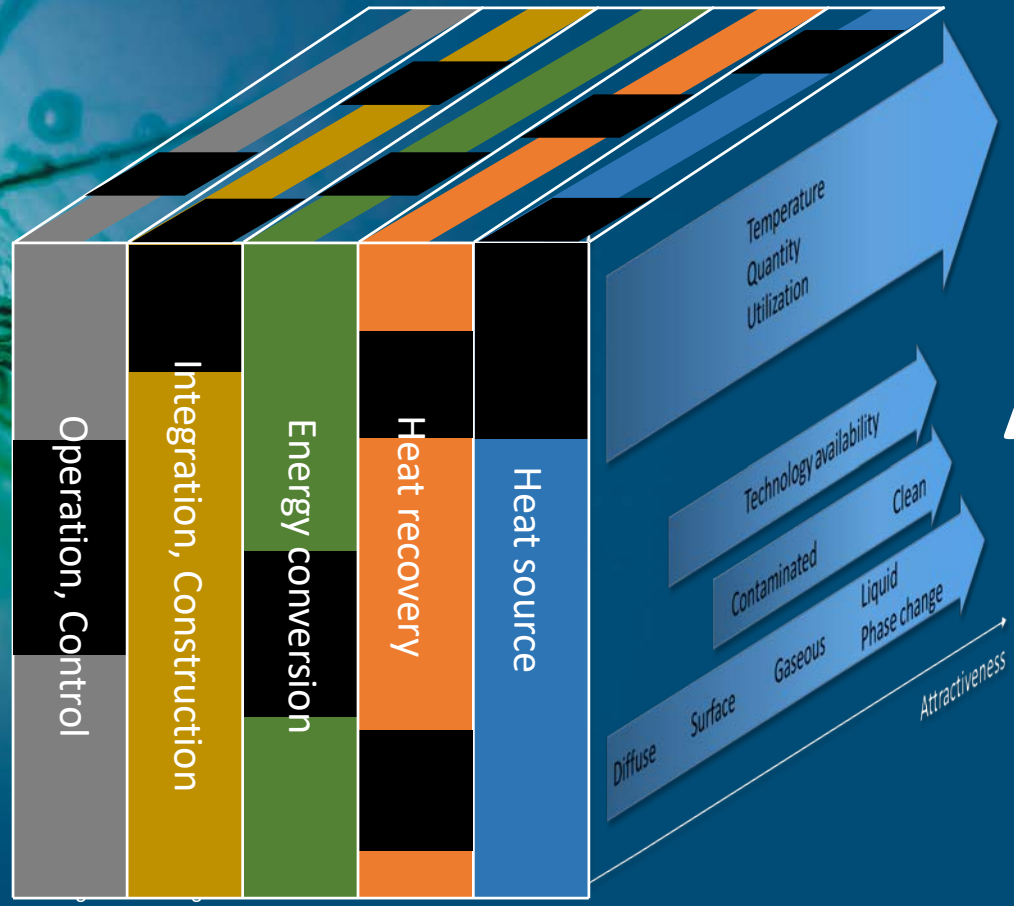
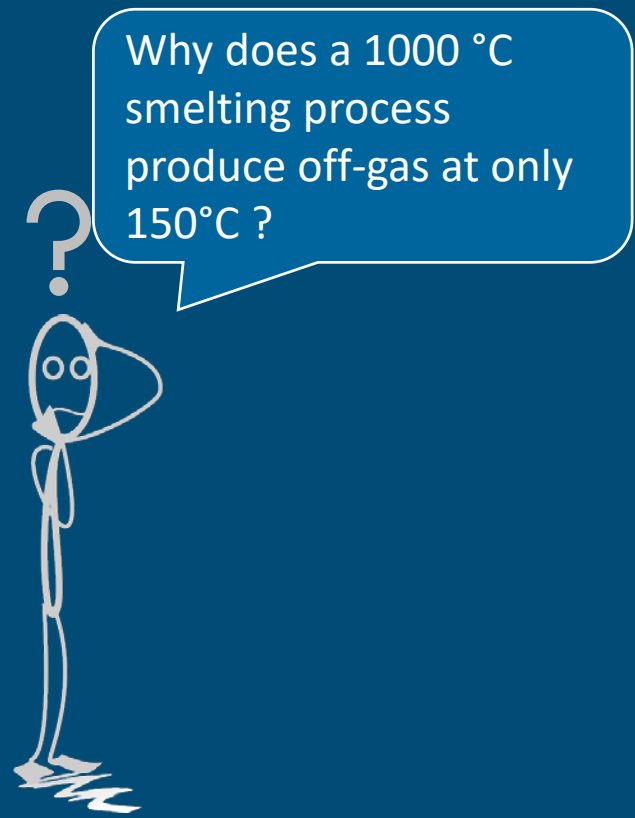
01 – Intro and Theme of the day
Trond Andresen, SINTEF

HighEFF



Practical vs. Academic

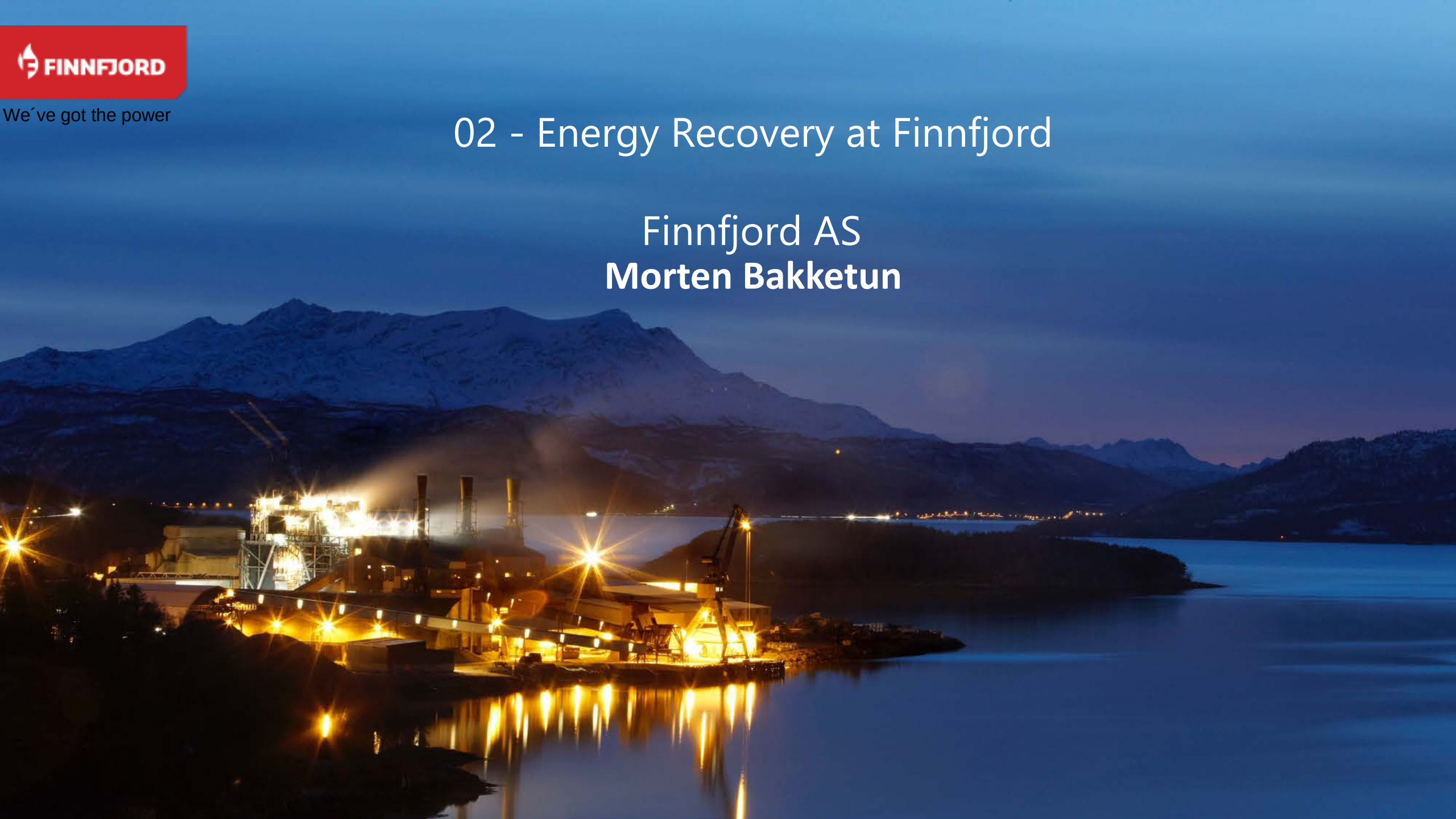


FINNFJORD

We´ve got the power

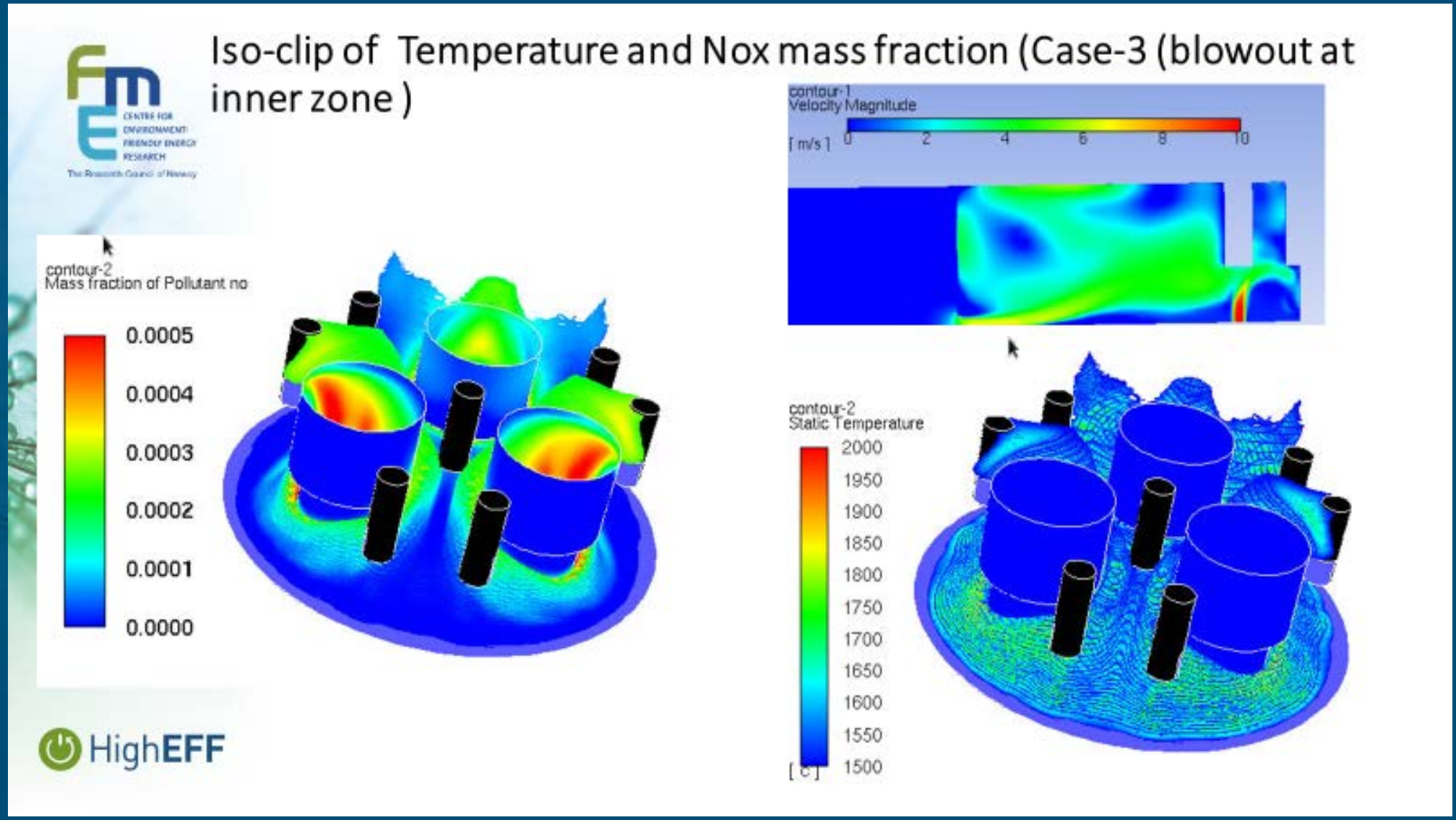
02 - Energy Recovery at Finnfjord

Finnfjord AS
Morten Bakketun



03 – Controlling flue gas temperatures in silicon furnaces

Balram Panjwani, SINTEF



04 – Mitigation of furnace dynamics
Daniel Rohde, SINTEF

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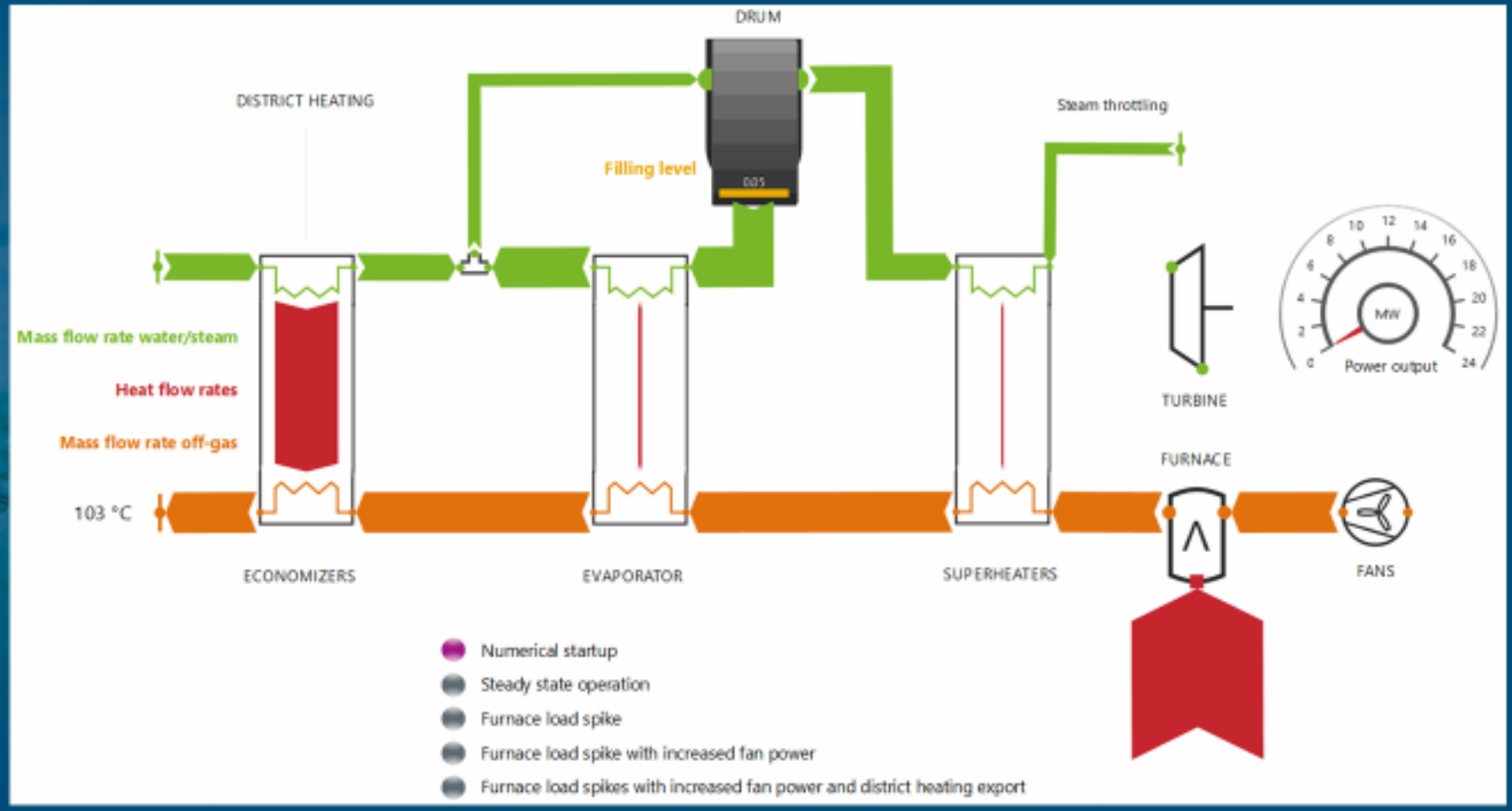
Example results (animated)



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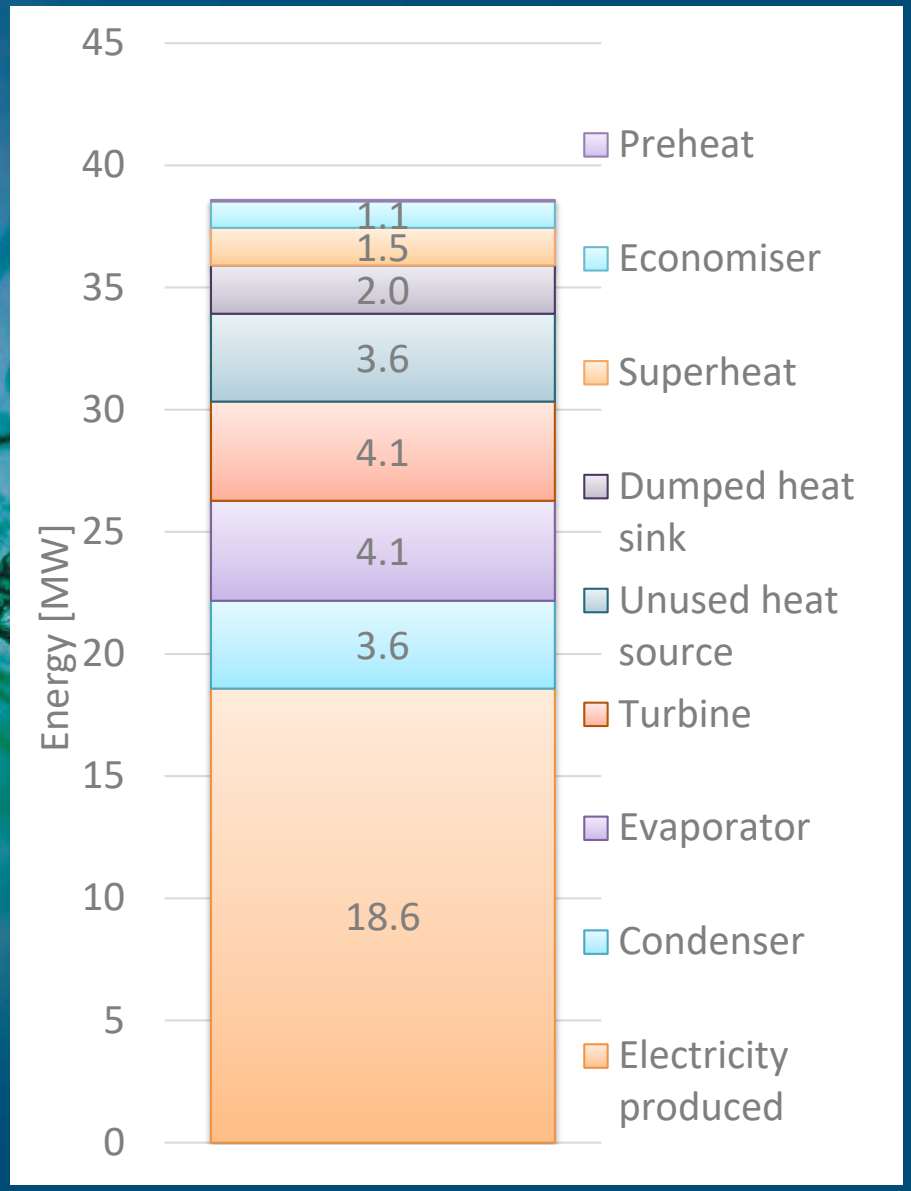
05 – Elkems practical experiences with Energy recovery
Paul Wilpert, Elkem

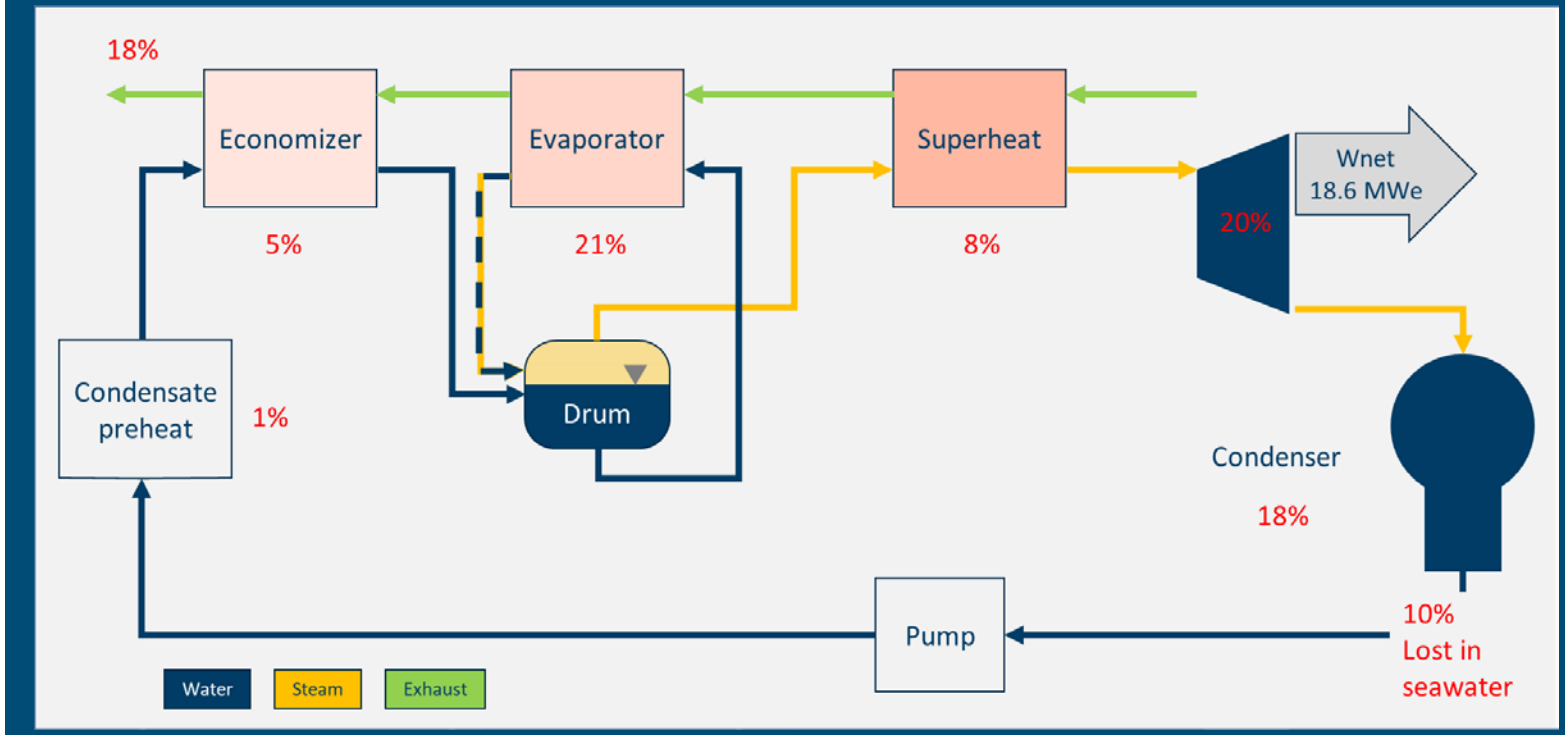
ELKEM'S PRACTICAL EXPERIENCES WITH ENERGY RECOVERY

Paul Wilpert
Process Engineer – Energy Recovery
Elkem Thamshavn

06 – Academic analyses of improvement potential at Elkem Thamshavn

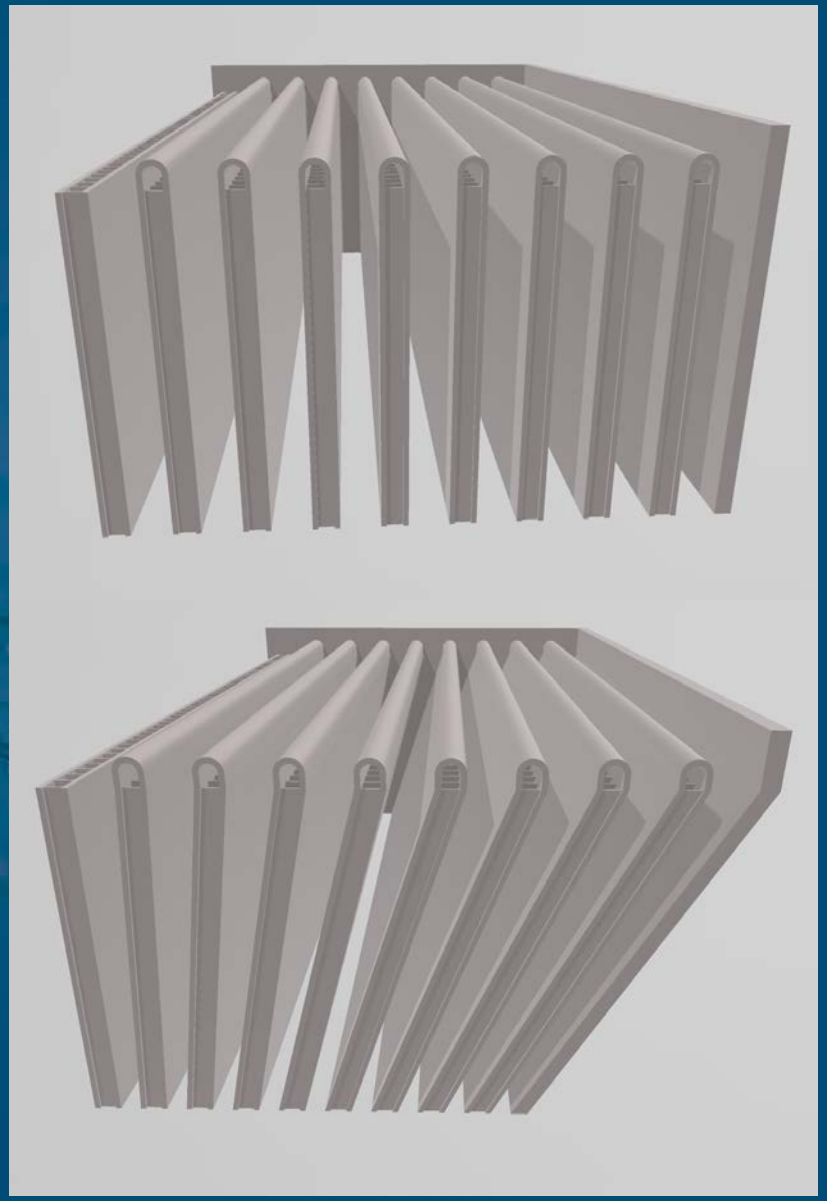
Monica Nikolaisen & Vidar Skjervold, SINTEF

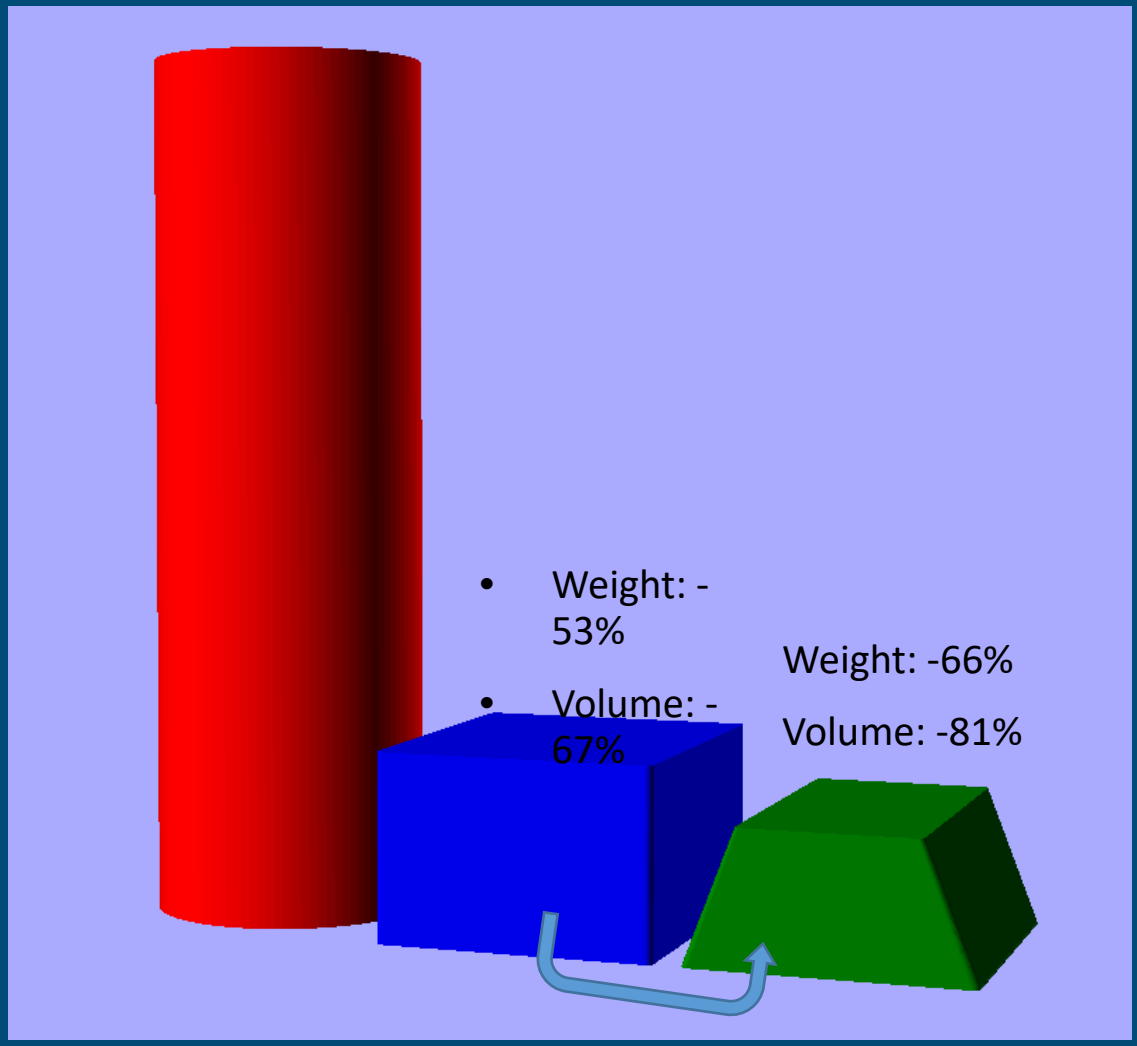




07 – Novel heat recovery concept development

Vidar Skjervold, SINTEF





- Weight: -53%
- Volume: -67%

Weight: -27%

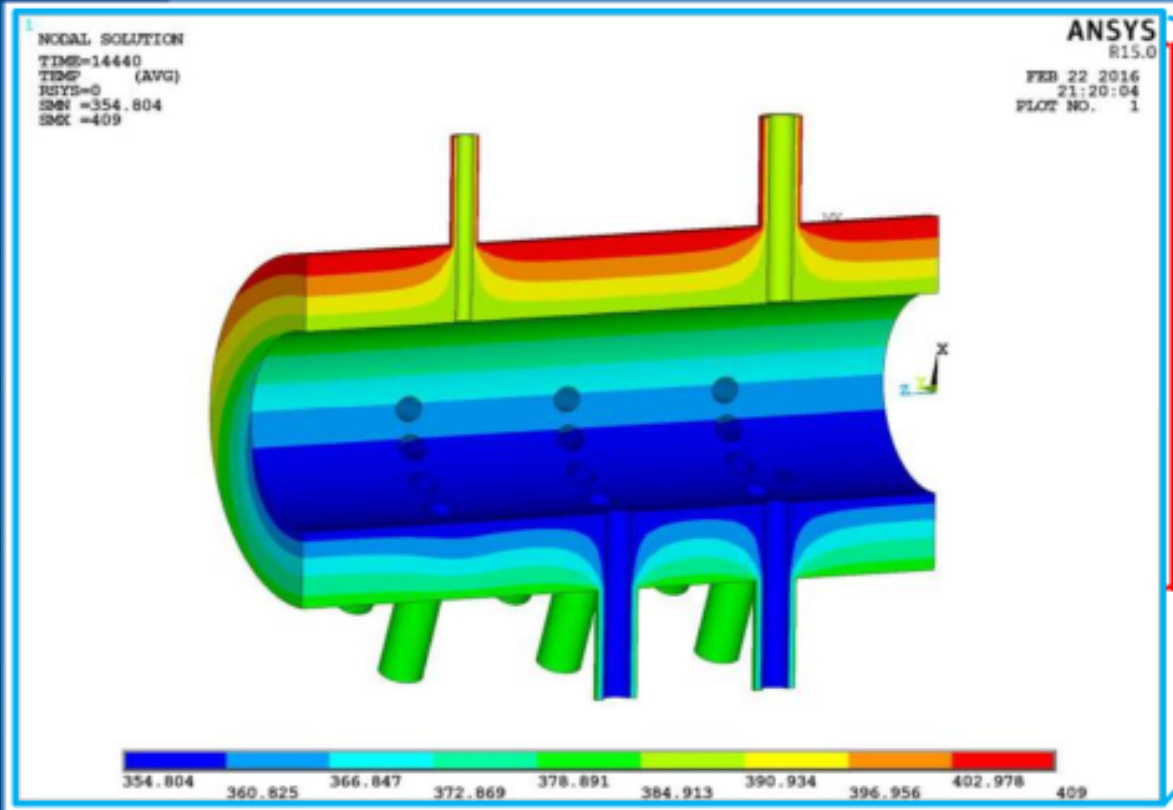
Volume: -41%

08 – Thermo-mechanical fatigue of components exposed to pressure and temperature variations

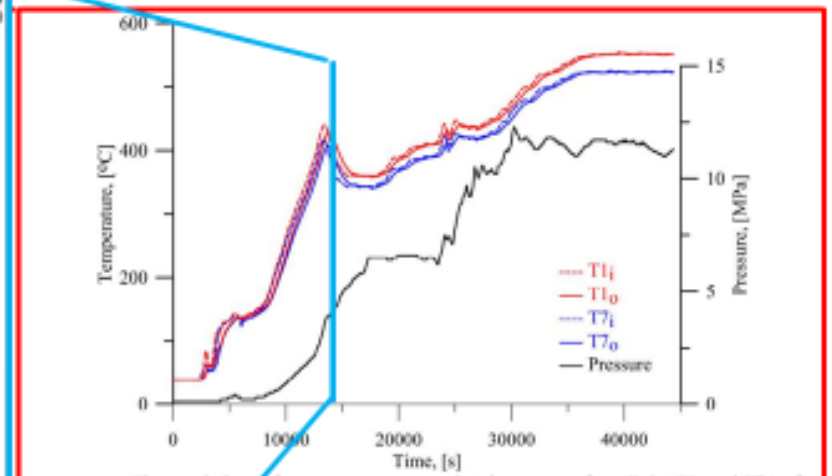
Marcin Pilarczyk, NTNU

5. Component cycling operation at elevated temperatures

Live steam outlet header (120 MWe steam boiler)



Temperature distribution at t = 14400 sec [6]



Time variations of temperature measured at the outer surface (Point $T1_o$ and $T7_o$) of the outlet chamber during the boiler start-up, the calculated temperature at the inner surface ($T1_{in}$, $T7_{in}$), and the measured steam pressure

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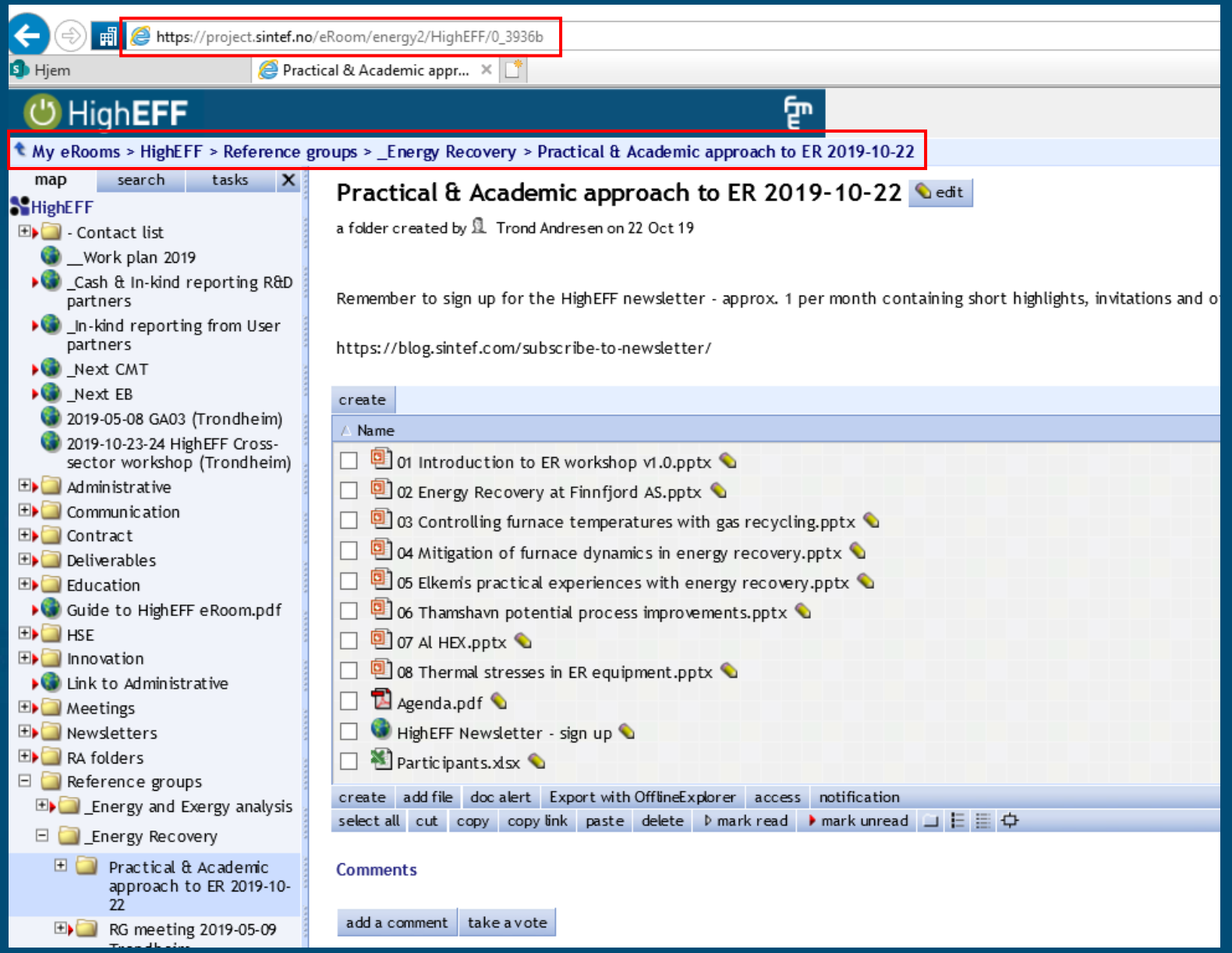

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