

Consortium Materials technology for thermal energy processes – minutes board meeting no 1/18

Date	March 2, meeting time 13.00-15.00	
Place	Telephone meeting	
Participants	Erik Skog (chair) Anna Jonasson Bengt-Åke Andersson Bo Jönsson Eva-Katrin Lindman Vesna Barišić Pamela Henderson Søren Aakjær Jensen Hanna Kinnunen Thomas Höjer Owe Mårs Jan-Erik Svensson Bertil Wahlund (secr.)	Erik Skog AB E.ON Energilösningar E.ON Energilösningar Kanthal Stockholm Exergi (fd Fortum värme) Sumitomo SHI FW (SFW) Vattenfall Ørsted (Dong Energy) Valmet (new stakeholder) Calderys (new stakeholder) Höganäs (new stakeholder) Chalmers Energiforsk
Prevented	Andreas Borg Lars Mikkelsen Dilip Chandrasekaran Marie-Aude Porter Matti Huhtakangas Erik Dahlén Jukka Meskanen Annika Stålenheim Edgardo Coda Thomas Norman Jesper Ederth Christoph Gruber Sebastian Kaiser Johan Moverare Rikard Norling	GKN Aerospace B&W Vølund Kanthal/Sandvik Heating Technology Siemens MH Engineering Stockholm Exergi (fd Fortum värme) Fortum Vattenfall Sumitomo FW B&W Vølund Sandvik Materials Technology Andritz Andritz Linköpings universitet Swerea KIMAB
Distribution	participants, prevented and Sven Andersson Per Kallner Andreas Sundlöf Erik Westman Heike Martinsson Henrik Lindståhl Mikael Fransson Ulf Hagman Erika Antonsson Toni Holkko Lucas Enström Ulf Lindqvist Dag Wiklund Jesper Baaring Johan Thelander Magnus Eriksson Per Tunberg Patrik Schneider Jasmin Aspen Erik Thornström	
	B&W Vølund/Götaverken Vattenfall Söderenergi Söderenergi Söderenergi Tekniska verken i Linköping AB Tekniska verken i Linköping AB Göteborg Energi AB Göteborg Energi AB Gävle Energi Gävle Energi Jämtkraft AB Jämtkraft AB Öresundskraft Karlstads Energi AB Mälarenergi AB Mälarenergi AB Kraftringen Kraftringen Swedenergy	

1 Agenda

The distributed agenda was approved.

2 Person to approve minutes

BJ was elected to approve minutes (next present person/company on participants list).

3 Minutes from board meeting 4/17

The minutes from board meeting 4/17 was approved with the following comments:

- A meeting with project leaders has been held with the aim to discuss and analyse the call text and possible strategy with applications.
- The KME future group was assembled to discuss the next period, report on item 7.

4 Notifications

4.1 Coming dissertations

Upcoming dissertations

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Recently defended dissertations

Nooshin Mortazavi, Title of PhD thesis: *Novel Insights into the Oxidation of High Temperature Alloys - The Role of Environment, Microstructure and Reactive Elements*, December 21, Chalmers

4.2 Coming conferences and workshops

KME/HTC programme conference 2018, March 20-21, Stockholm, discussed further at item 8. Programme:

<http://www.energiforsk.se/konferenser/kommande/kme-htc-research-symposium-2018/programme/>

Boiler days (Panndagarna, Värme- och Kraftföreningen), April 17-18, Örebro

The 27th International Conference on the Impact of Fuel Quality on Power Production and the Environment, September 24-28, 2018, Lake Louise, Canada. <http://blogs2.abo.fi/fuelqualityimpact/>

High Temperature Corrosion under Complex Conditions, Deposits, and Salts: Towards Greener Energy, September 26-29 2018, Dechema, Frankfurt, Germany.

5 Budget

BW showed the updated budget follow. Follow up is made of funds used, requested cash and reported in-kind. The reporting follows the plan in most cases and two projects reports in-kind contribution over 100 %. Updated budget in annex 1.

In the following projects deviations from plans are identified:

- KME-717, *Boiler corrosion at lower temperatures – influence of lead, zink and chlorides*, low industry in-kind contribution. Project leader RN check the status at the industries. BW provide figures on up to now reported in-kind and contact the industries.

- KME-720, *The effect of increased fractions of waste wood on water wall- and superheater corrosion*, low industry in-kind contribution due to the previously reported incident with a water wall probe. The low in-kind has resulted in a deficit at Chalmers (approx 1 MESK). Discussions is ongoing on how to solve the issue. One possibility to reduce the deficit could be that companies allocate in-kind to KME-720 from other projects reaching over 100 % in-kind.

A reminder about the last reporting date for industry in-kind:

- Report in kind contribution up to April 15.

6 Follow up of project

Final project reports will be evaluated and approved by board in coming meetings.

KME-720, *The effect of increased fractions of waste wood on water wall- and superheater corrosion*, faced as reported problems with water wall probe. Economics discussed above in item 5.

Finalised projects:

- KME-707, *Improved Steam Turbine Design for Optimum Efficiency and Reduced Cost of Ownership*
- KME-708, *High temperature corrosion in used-wood fired boilers*

7 Next KME programme 2018-2021

BW updated regarding the status of the planning for the new programme and reported from KME future group meeting held February 1.

As informed at previous meetings, there are two parallel processes, one for respective Energy Agency programme from which KME will apply research grants; *Steam based processes*, from now called *Biopower*, and *Turbines for future technologies*.

Turbines for future technologies

The programme *Turbines for future technologies* is already ongoing. KME has conducted a dialogue with SEA on when materials technology research could be included in the programme. SEA's original plan was to open for materials research towards end 2018/beginning 2019 in a third call, which is too late for KME. Result of the dialogue so far:

- SEA now plans to open a call after summer
- The four ongoing gas turbine-related KME projects with PhD students (KME-702, KME-703, KME-706, KME-719), were welcomed to submit applications for funding to finalisation outside the SEA calls and programmes. These applications were submitted end of January. The applications include common KME texts and a coordination budget for KME/Energiforsk. Decisions are expected during the spring.

Biopower – thermal conversion of biofuel to power and heat (previously called Steam based process)

SEA has allocated 87 MSEK state matching funds over the years 2018-2021 to the programme (state matching funds in current KME projects in the area steam based process amounts to approx. 25 MSEK). Materials technology is one of six areas. The general programme goals correlates well with KME's

interest: fuel flexibility, operating flexibility, power yield and availability for biofuel and waste. Besides, collaboration and continuous knowledge exchange between industry, institutes and academy in the same branch and companies in different parts of the value chain, is one of the main programme goals and encouraged.

In the first call, opened late 2017 and with March 15 as due date, new information and conditions aroused: maximum project budget 12 MSEK and expected project budget 2-5 MSEK.

Report from KME future group

The KME future group concluded that the KME consortium should be maintained, and the industry is recommended to form a KME consortium for the coming period.

The KME consortium is an important forum for networking and collaboration that includes well-established routines for IPR, information exchange, results dissemination (incl the KME/HTC conference). The network of companies over the value chain and researchers is a key factor for creation of relevant research projects. KME/Energiforsk will besides provide for dialogue and give input to SEA regarding industry relevant research.

The industry can participate as in previous periods, with cash for running the consortium and with in-kind in projects, via a consortium agreement and specific project agreements.

Due to the new prerequisites in call, the future group recommend KME to change strategy and instead of larger consortium applications with packages of projects, elaborate and submit separate and specific KME project applications. The respective project leader is responsible to submit the project to SEA and the applications should include:

- a) common KME texts showing that the resp. project is a part of KME. BW responsible to elaborate the text.
- b) a budget for KME/Energiforsk for results dissemination and communication from the project. Energiforsk will contribute with industry cash to be matched by the SEA.

Projects approved by the SEA, and other financing bodies later on, will be coordinated by KME and make up the KME-project portfolio.

Comments from board:

- The KME text to be included in the applications should be further elaborated. Results dissemination is a good word to use, while administration should be avoided. BW distribute the text to board and project leaders for comments.
- Need to allocate a "management budget" to each project, that is matched by SEA.
- In coming programme period, the collaboration should be further developed, for example with workshops on specific items or topics.
- Great advantages with access to the entire value chain, and the possibility to connect the activities through it. We need to maintain the dialogue within the value chain.
- The new features compared to current period is manly that the applications are to be submitted in larger programme calls, which gives larger uncertainties on which projects will be approved.

- Approved projects will as in current period get a decision from SEA, and a project agreement to regulate IPR, confidentiality, undertakings etc, will have to be written.
- It was discussed how the programme management could be financed. Board assume similar level as before on the respective companies' cash contribution to programme management. Some companies have already accepted the offer, while some other find it easier to contribute with cash in each project. Discussion and negotiations will continue during the spring.

7.1 Project proposals to programme

Seven new KME projects under development, to be submitted in the *Biokraft* call:

- *Increased fuel flexibility and performance for boilers with challenging fuels*
Proposal from Swerea KIMAB as project leader and with Mälarenergi, Valmet, EON, Vattenfall, Sthlm Exergi, Falun, Sandvik/Kanthal, MH Engineering, Calderys as project partners
- *New materials and Oxygen Carrier Aided Combustion for improved competitiveness of FB plants using renewable fuels (previously called Materials development towards loop seal and water wall corrosion)*
Proposal from Chalmers/HTC as project leader and with EON, Sumitomo FW, Sandvik/Kanthal, Sandvik MT, MH Engineering, Stockholm Exergi as project partners.
- *Increased flexibility and power-production from biomass through material development and corrosion prediction*
Proposal from Chalmers/HTC as project leader and with Ørsted Sandvik/Kanthal, Sandvik MT and Valmet as project partners.
- *High performance coatings to combat erosion-driven damage in power plants*
Proposal from Chalmers and Höskolan Väst, with Höganäs, Mälarenergi and MH Engineering as project partners.
- *Heavy section austenitic stainless steel for the future header and piping material in high-efficient biomass-fired power plants (previously called Thick-walled austenitic stainless steel for the future header and piping material in high-efficient biomass-fired power plants)*
Proposal from LiU as project leader with Sandvik MT (main partner) and Sumitomo Foster Wheeler as project partners. The project is a continuation and extension of KME-701.
- *Design of a new generation of 12 % chromium steels*
Proposal from Chalmers as project leader with Siemens as project partner. The project is a continuation of KME-710.
- *FlexBalans*, Proposal from Lund and KTH. No industrial partners but topics could be connected to the research and industry.

A further initiative elaborated outside KME but with connections to KME:

- *Total fuel cost – a calculation tool*. Broad initiative by Energiforsk, covering KME and Värmeforsk/SEBRA. The goal is to create a calculation tool for calculation of the total fuel cost of a specific fuel in a specific plant.

8 Programme conference HTC/KME

The 2018 conference will be held **March 20-21, 2018**, at Spårvagnshallarna, Stockholm. Programme

<http://www.energiforsk.se/konferenser/kommande/kme-htc-research-symposium-2018/programme/>. Please distribute and invite colleagues.

Comments:

- It was proposed to invite SEA to give a talk.

9 Others

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10 Next meetings

2018 meetings. Tentative plan, doodle polls will be distributed to set the dates:

- Mid April, telephone, board meeting to conclude the current period, first round to revise and approve final project reports
- May/June, physical meeting, Stockholm, start-up meeting of new KME period (tentatively be held same day as HTC board, aim to synchronise with HTC).

2018 conference

- KME/HTC programme conference 2018, March 20-21, Stockholm

Minutes by

Bertil Wahlund

Minutes approval

Bo Jönsson, Kanthal

Minutes approval

Erik Skog, chairperson

Projects

Budget follow up, total costs

Programme budget [kSEK]	Programme and project financing				Funds used, kSEK					
	Total	SEA	%	Industrv	Cash SEA, req		Industry total			
					kSEK	%	In-kinds	cash	%	
For projects	115 000	46 000	40,0%	69 000						
Programme management	8 950	3 800	42,5%	5 150						
Sum:	123 950	49 800	40,2%	74 150						
Decided projects										
KME-701 (39297-1)	7 180	2 872	40,0%	4 308	2224	77%	4124		96%	
KME-702 (39279-1)	14 435	5 735	39,7%	8 700	5162	90%	8791		101%	
KME-703 (39296-1)	5 447	2 167	39,8%	3 280	2167	100%	3280		100%	
KME-705 (39298-1)	1 000	400	40,0%	600	351	88%	593		99%	
KME-706 (39283-1)	12 500	5 000	40,0%	7 500	2873	57%	5828		78%	
KME-707 (39281-1)	7 238	2 895	40,0%	4 343	2436	84%	3692		85%	
KME-708 (39270-1)	7 383	2 963	40,1%	4 420	2963	100%	4849	15	110%	
KME-709 (39287-1)	10 612	4 245	40,0%	6 367	3643	86%	5950	23	94%	
KME-710 (39286-1)	2 000	800	40,0%	1 200	700	88%	1137		95%	
KME-711 (39299-1)	12 460	4 984	40,0%	7 476	3833	77%	6154	627	91%	
KME-713 (40038-1)	2 400	960	40,0%	1 440	828	86%	189		13%	
KME-714 (40118-1)	7 590	3 036	40,0%	4 554	1932	64%	3570	76	80%	
KME-715 (40040-1)	2 361	944	40,0%	1 417	518	55%	1389		98%	
KME-717 (40892-1)	4 491	1 796	40,0%	2 695	590	33%	2019		75%	
KME-718 (41515-1)	2 633	1 053	40,0%	1 580	261	25%	1398		88%	
KME-719 (40893-1)	9 102	3 500	38,5%	5 602	2451	70%	3800		68%	
KME-720 (41048-1)	5 205	2 082	40,0%	3 123	658	32%	1198		38%	
Programme management, tot	8 950	3 800	42,5%	5 150	3686	97%	3649		71%	
Tot. for projects:	114 037	45 433	39,8%	68 605	33589	74%	57960	741	86%	
Remaining budget:	963	567	58,9%	396	3 686		3649			
Share decided, %	99,2%	98,8%		99,4%						
Share remaining budget, %	0,8%	1,2%		0,6%						