

## MINUTES OF THE BOARD MEETING PARIS, FRANCE, 28 JUNE 2011

### Present:

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Bernard Quoix, President (BQ)	TOTAL
Catherine Goy, Vice President (CG)	E.ON UK
Herwart Hoenen, Treasurer (HH)	RWTH Aachen
Andy Williams (AW)	Wood Group
Giovanni Cerri (GC)	University Roma TRE
Uwe Kaltwasser (UK)	MTU
Gary Lock (GL)	Frazer Nash Consultancy
Pericles Pilidis (PP)	Cranfield University
André Mom, President Emeritus (AM)	ETN
Christer Björkqvist (CB)	ETN
Julie Linde Kjeldsen (JK)	ETN

### Invited Presenter:

Klaus Broichhausen	Schuh Complexity Management
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### Apologies:

<i>Jacques Maunand (JM)</i>	<i>EDF</i>
<i>Jonathan Clarke (JC)</i>	<i>Shell</i>

### Content:

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- Welcome
  - Review and Approval of MoM Budapest March 2011 (BQ)
  - Review of Action List from MoM Budapest March 2011 (BQ)
  - Review of ETN Activities Update (CB)
  - Technology Matrix Review Outcome – Priority topics (CB)
  - Invited presentation by Klaus Broichhausen ‘Positioning ETN for the Future-Implementation Growth Strategy’
  - Review of new initiatives/project proposals (CB)
  - IGTC-12: Structure sponsorship and other initial preparations (CB)
  - Review of the ETN Paper (AM/CB)
  - Upcoming Meetings 2011-2012 (CB)
  - Closing of the Board Meeting (BQ)
- Annex: Review of Action list from previous Board meeting (28-29 March 2011, Budapest)

### 1. Welcome

B. Quoix opened the meeting and welcomed the Board members. J. Maunand and J. Clarke sent their apologies for not being able to join the Board meeting.

### 2. Review and Approval of the MoM Budapest March 2011

The Board unanimously approved the March 2011 Board Meeting minutes.

### 3. Review of Action List from the MoM Budapest March 2011

See Annex.

### 4. Review ETN Activities Update

The Board took note of the update on ETN activities circulated ahead of the meeting by the ETN Office, and discussed the following points further:

#### ETN Position Paper on the Integration of Renewables into the Grid:

C. Björkqvist reported that the **ETN position paper on the integration of renewable energy into the grid** has been disseminated to key EU contacts.

**Action:** CB to follow up with key contacts who have already received the position paper in order to collect feedback.

**Action:** the Board Members were asked to copy in the ETN office when forwarding the ETN position paper, in order to monitor who has received it.

#### Annual ETN Workshop, October 2011:

With regard to the **October Workshop**, C. Björkqvist suggested to have Project Groups meetings prior to the ETN Workshop (12-13 October 2011) in order not to dilute the interest in new initiatives. This way PG chairmen can report back during the Workshop. These meetings could be held in conjunction with the workshop on 11 October 2011 or separately earlier.

**Action:** CB to organise separate meetings/teleconferences for the new initiatives, prior to the ETN Workshop in October 2011.

#### Events attended by ETN:

A. Mom participated at **Power-Gen** representing ETN. During the networking, he identified a number of potential members. The ETN office is in the process of following up with these organisations. U. Kaltwasser suggested that in future also companies from other industries using gas turbines (e.g. chemical, food and paper industries) should be targeted as well as potential members.

A. Williams suggested that ETN members should have access to summaries of presentations and background documents of the **events attended by ETN staff**. CB confirmed that these meetings are listed in ETN's newsletter with either a short summary or a note that further information can be received upon request.

#### ETN document templates:

C. Björkqvist presented various **templates** developed by the ETN Secretariat, which had been circulated to the Board prior to the meeting. These should facilitate clearly structured outlines and a gated process to initiatives. New proposals in the requested format should then be assessed by the Board.

A. Williams highlighted the importance of transparent criteria for **fair assessment** of the proposals, for example as a flow diagram.

**Action:** CB to circulate the new templates to the ETN members, for future use in ETN related activities.

**Action:** CB to draft an evaluation process with clear criteria for a fair and transparent evaluation of proposals, for example in a flow diagram.

Cooperation proposals:

ETN has informally been asked by Klaus Brunn for a potential interest in cooperation in new yearly short courses developed by **ASME** and individual European Universities. In 2011 the courses will be held together with the Helmut Schmitt University in Germany.

Another potential activity to be explored is that **Turbomachinery International** has presented ETN with the possibility of writing a blog. ETN asked for additional information to get a clearer idea of what sort of involvement this would entail. The Board was not too enthusiastic about this due to the required time involvement but await more information before taken a final decision.

A. Mom mentioned that Pennwell would like to collaborate with ETN. C. Björkqvist suggested in that case an ASME-type of cooperation. The board required a more concrete suggestion before deciding on this.

**Action:** CB to obtain more information regarding the possible involvement of ETN in the European courses to be developed by ASME.

**Action:** CB to follow-up on a clarification on the blog for Turbomachinery International.

**5. Technology Matrix Review Outcome – Priority topics**

C. Björkqvist presented the outcome of the review of the Technology Matrix and the prioritisation of topics. These topics would form the basis for the Workshop and be advocated to the European Commission. They would also help to formulate the topics for the IGTC-12 Call for Papers. The results of the Matrix review were circulated. The Board suggested having an additional column in the Technology Matrix, explaining the reason for focusing on this topic, and outlining the potential solutions. H. Hönen also presented the possibility of having a TC on 'External Equipment', which is not directly related to the GT but still causes problems. This topic could appeal to filter companies.

The Board made following suggestions for the Technical Committee Priorities:

TC1: Cycle Efficiency	
1. System Integration – Whole Engine Dynamics	There were no comments or recommendations on the TC1 priorities.
2. Component Efficiency – Wide operation range, with high efficiency both at full load and part load	
3. Innovative Cycles – Wet Cycles and hybrid Plants	

TC2: Fuel Flexibility and Emissions	
1. Natural Gas Interoperability	<p>It depends on the particular machinery whether Natural Gas Interoperability is a potential issue or not.</p> <p>A longer-term focus is also needed, looking at <b>high- H<sub>2</sub> and alternative energy sources</b>. This could then lead to a change in title to <b>‘Alternative Gas Fuels’</b> (including liquid fuels).</p> <p>The issue of <b>condensate</b> was also raised, and the need for a study on what the market status and requirements are. For example, Total experiences problems with condensate in remote areas (e.g. Algeria and Russia), where it needs to be transported long distances as they cannot be used as fuel.</p>
2. Hydrogen Rich Gas (>40% H <sub>2</sub> )	
3. Gas Fuel Blends – syngas, biogas, natural gas	
4. CFD - development and validation	CFD simulation is more a tool, which could be used for all prioritised topics listed under TC2.

TC3: Material Degradation and Repair Technologies	
<p><i>Overall comments:</i></p> <p>It was suggested that ‘Materials Behaviour and Degradation’ might be a more appropriate title; while it was noted that degradation can also result from other factors, not only materials degradation.</p> <p>In recent developments materials have not kept up with technology, and while there is development in coatings it is still necessary to address whether to sacrifice efficiency for longevity.</p> <p>It was also noted that none of the prioritised topics covered repair technologies in this TC. It was recommended to consider to include this or to change the title.</p>	
1. Combustor and Turbine Performance - Corrosion	

2. Compressor Performance – Degradation Modes and Fouling	This point does not fit the overall TC title, and it was also recommended that ‘erosion’ should be added.
3. Hot Section Life – influence of fuel/loading/operation regime on degradation behaviour of critical parts	

<b>TC4: Condition Monitoring, Instrumentation and Control</b>	
1. Avoid Borescope Inspection – Gas Path Damage	The word ‘review’ was suggested to be used instead of ‘avoid’.
2. Avoid Compressor Cleaning – Filtration Techniques	This point does not fit title (it is not monitoring), and it was suggested to be moved to TC3.
3. Advanced Controls – Advanced Sensors	

**Action:** CB to contact Chairmen to provide the above feedback and to discuss suggestions for targeted topics for the Workshop and the call for papers for the IGTC-12 based on the Matrix. Any changes to the matrix after discussion with the chairmen should be circulated to the board.

#### **6. Presentation on ‘Positioning ETN for the Future-Implementation Growth Strategy’**

K. Broichhausen presented a 3-step plan for making ETN an even more successful and efficient organisation:

- Step 1 would define where ETN currently stands and how/where it aims to develop.
- Step 2 outlines priorities and how to achieve those goals.
- Step 3 presents a roadmap consisting of processes and implementation steps.

The board appreciated Klaus Broichhausen’s presentation and suggested offer. The Board noted that the presentation confirmed that ETN is on the right track with its strategy implementation and that Step 1 has already been finalised within ETN, while Step 2 and 3 are in the process of being developed and implemented. The next step would be to broaden and develop further step 2 and 3.

While it was recognised that it would be good to document an implementation plan in a more professional way which could speed up this process it was questioned whether the costs would provide enough benefits that could be justified to the ETN members. It was also noted that ETN as a non-profit organisation are not VAT registered which would result in difficulties of buying external services. It was suggested that a way forward could be a service exchange arrangement, as an agreement would clearly provide increased visibility for Schuh Groups services and expertise.

**Action:** CB to discuss with K. Broichhausen and propose an exchange of his services related to step 2 and 3 in exchange for ETN membership for 12-18 months instead of paying for his services. If accepted ETN would request K. Broichhausen to present a proposal with specific deliverables.

## **7. Review of new initiatives and project proposals**

The Board reviewed and made recommendations on the new initiatives. C. Björkqvist suggested that all the new initiatives and proposals should be presented at the ETN Workshop in October, following meetings held prior to the Workshop. All initiatives and project proposals should be adapted to this format and then sent to the Board for comments.

<b>New ETN initiatives</b>	<b>Board recommendation</b>	<b>Actions</b>
<u>1. Top Cycle Proposal</u>	The board welcomed this initiative.	CB to send to the Board, a draft invitation for users for a TopCycle meeting to be held on 20 September.
<u>2. CSP for GT Hybrid Systems Proposal</u>	There will be an EU funding call on this topic published on 20 July.	CB to organise a meeting for the CSP/GT Hybrid cycle proposal once the EC Call has been published.
<u>3. Providing Wind Power Back-up with Carbon Dioxide Neutral Gas Turbines Virtual Gas Turbine</u>	The name of the author needs to be indicated. It should be mentioned in the paper that CCS has been operating for 20 years in the US. The paper needs to be adapted to the new templates.	CB to forward comments to author.
<u>4. TERA for Reducing Risks of Zero/Low CO2 Power Concepts</u>	The board believes that TERA could be a useful instrument and it also has a good reputation with the European Commission.	Should look for opportunity to include the TERA model in future R&D projects.
<u>5. Advanced Sensors Initiative</u>	Further technology watch is recommended for this initiative.	CB to report feedback to the advanced sensors group.
<u>6. Virtual Gas Turbine Testing Initiative</u>	This initiative links to different CFD models, testing the individual operating conditions. A similar EU-funded project between RR and Airbus exists.	GL to send CB information about a similar EU-funded project to the Virtual GR Testing Outline.

**Action:** CB to organise separate meetings/teleconferences for new initiatives, prior to the ETN Workshop in October 2011.

## **8. IGTC-12: Structure sponsorship and other initial preparations**

The Board discussed the International Gas Turbine Conference, which will take place in Brussels, Belgium in October 2012.

The Board suggested that the Call for Papers should be focused on problems, encouraging papers that provide targeted solutions, for example, coatings with ultrasound testing of materials. The goal of the technology sessions should be to address main issues and challenges, and find research topics that can lead to solutions, for example, advanced sensors to better judge whether a borescope inspection is needed.

The Board suggested that the participation fee at the IGTC-12 could be slightly increased, and to introduce a special fee for non-member speakers. Moreover, it was agreed that a maximum of two representatives from any one ETN member organisation should be entitled to the reduced member fee. In case of more representatives from the same organisation wishing to attend, the additional participants need to pay the full non-member price.

The Board suggested the following fees for participation:

350 euro for members (for a maximum of 2 representatives, then non-member fee)

600 euro for non-members

400 euro for (non-member) speakers

**Action:** CB and CAB to present detailed call for papers, the cost of participation and other specifics concerning the logistics and content of the IGTC-12.

## **9. Review of the ETN Paper on Natural Gas**

The Board discussed the ETN Paper on natural gas. The position paper is currently drafted to be used as an internal ‘briefing paper’ to inform ETN members. The paper has been ‘softened’ considerably following the shift in EU policy in favour of natural gas, but the key message remains that there should be a shift from coal towards gas, and the importance of developing CCS for cyclic operation.

It was suggested to include additional examples from other countries in the paper if it is available. It was also pointed out that there is 300 years of gas reserves, compared to 800 years of available coal reserves.

The Board emphasised that the paper must be read and approved by J. Maunand, who has previously raised concern with the conclusions drawn in the earlier draft version of the paper.

**Action:** AM to follow up on feedback with Dieter Krapp and Gasunie.

**Action:** AM to incorporate comments from Board members.

**Action:** JM to review the paper.

## **10. Upcoming ETN activities 2011**

CAB 2012 meeting	12 July 2011	Brussels, Belgium hosted by Laborelec
TopCycle user meeting	20 September	Brussels, hosted by Laborelec
Exhaust systems meeting	11 October 2011	Brighton, UK, hosted by Boustead International Heaters
Workshop	12-13 October 2011	London/Brighton, UK
Board meeting	13-14 October 2011	Brighton, UK with the participation of Ron van Gestel (TC3) and Chris Dagnall (TC4)

Board meeting	29-30 November, or 14 December 2011	Brussels, Belgium, hosted by Laborelec, or Den Haag, the Netherlands, hosted by Shell (tbc)
H <sub>2</sub> -IGCC meeting	8-9 December 2011	Zurich, Switzerland, hosted by PSI
CAB 2012 meeting	February 2012	Stockholm, Sweden, hosted by Vattenfall (tbc)

### **ACTION LIST**

<b>No.</b>	<b>Action</b>	<b>Responsible</b>
1	The outstanding CNRS (Iskender Gokalp) payment must be sold to a debt collecting company. BQ and HH to send name of companies that buy debt internationally.	BQ/CB/HH
2	Werner Krebs to speak to Uwe Pagenkopf (Siemens) about membership. CB to follow up.	BQ/CB
3	Contact Linz AG regarding membership next year.	AM
4	Inform Ulrich Orth and Sven Boye (MAN) about October Workshop topics. (pending membership)	HH
5	Follow up with the new boss of Simon Raymond at Volvo later this year regarding ETN membership.	UK
6	Once the agenda for the Workshop is finalized CB will contact Sauri Makinen to invite her.	CB
7	Follow up with Mike Pepper and Richard Huttington (through David Griffith) at Exxon Mobil on membership. Once the October Workshop agenda is finalized, it should be sent to both.	CB/BQ
8	Send Gasunie the new Briefing Paper on the Role of Natural Gas.	AM/CB
9	Follow up with GE Energy (Emmanuel Kerrand, Yves Menat) on potential membership.	BQ
10	Produce new ETN banner by October 2011.	CB
11	Follow up with Tanquy Poline, Air Liquide on the previously sent membership package.	UK
12	Ask TC leaders to collect short courses within their TCs ahead of the Workshop.	CB
13	Follow up with Turbocare (Helge Reymann, Frits de Jong).	CB/AM
14	Investigate alternative less costly options for WIKI hosting, and try to reduce telephone costs.	CB
15	Invite TC 3 and 4 (Chris Dagnall and Ron van Gestel) to the Board Meeting 14 October 2011.	CB
16	Contact ETN user members to provide a list of their GT fleet in Europe and globally.	CB
17	Follow up with key contacts who have already received the position paper on renewables integration in order to collect feedback.	CB



18	The Board Members were asked to copy in the ETN office when forwarding the ETN position paper, in order to monitor who has received it.	All
19	Organise separate meetings for the new initiatives, prior to the ETN Workshop in October 2011.	CB
20	Circulate the new templates to the ETN members, for future use in ETN related activities.	CB
21	Draft clear criteria for a fair and transparent evaluation of proposals, e.g. in a flow diagram.	CB
22	Obtain more information regarding the possible involvement of ETN in courses developed by ASME .	CB
23	Follow-up on a clarification on the blog for Turbomachinery International.	CB
24	Contact TC Chairmen to discuss suggestions for targeted topics for the Workshop and the call for papers for the IGTC-12 based on the Matrix.	CB
25	Discuss with K. Broichhausen the exchange of services for ETN membership.	CB
26	Send draft TopCycle Outline and draft invitation for the user meeting (20 September) to the Board.	CB
27	Organise a meeting for the CSP for GT Hybrid Systems Proposal once the EC Call is out.	CB
28	Provide feedback from Board to the Advanced Sensors Initiative group.	CB
29	Send CB information about a similar EU-funded project to the proposed Virtual GT Testing outline.	GL
30	Present detailed call for papers, the cost of participation and other specifics concerning the logistics and content of the IGTC-12.	CB/CAB
31	To review ETN Briefing Paper on the Role of Natural Gas based on the Board comments.	AM/JM
32	Speak to Pennwell, organizers of the Powergen Conference, who are interested in more collaboration with ETN.	AM

## **Annex**

<b>Actions</b> (from previous Board meeting, Budapest, 28-29 March 2011)	<b>Outcome / Next action</b>	<b>Responsible</b>
BQ to send a letter in French to Iskender Gokalp (CNRS).	E-mail sent, pending response. The next possible action is to sell debt to a debt collecting company. BQ to ask for the contact details of the lawyers. HH to send name of German company which buys debt internationally.	BQ /HH
Contact Uwe Pagenkopf (Siemens) to follow up on membership.	Done but no response. CB has asked Werner Krebs, key person from the H <sub>2</sub> -IGCC project to speak to U. Pagenkopf.	BQ/CB
Follow-up with Linz AG regarding membership in March / April 2011 again.	Currently focused on a new power plant construction. To contact next year.	AM
Follow-up on ETN membership with Ulrich Orth, MAN.	No decision taken due to change of R&D director at MAN. Ulrich Orth and Sven Boye should be informed and invited to the October Workshop (pending membership application).	CB/ HH
Contact Chris Floyd (RR) to discuss decision about membership and payment details.	Done.	CB
Follow up with the new boss of Simon Raymond at Volvo later this year as he might be more open to ETN membership	Pending	UK
Set up meeting with Helsingin Energy (Sauri Makinen) and Neste Oil in Finland. Invite Helsingin Energia to the October Workshop.	Neste Oil will not host October Workshop, but possibly in the future. Invite Sauri Makinen to the October Workshop once the agenda is finalized.	CB
Follow-up with David Griffiths, Exxon Mobil (VP of GTUI) on membership and copy BQ.	David Griffiths suggested contacting Richard Hutton, ExxonMobil Research & Engineering US. No answer received yet. BQ suggested contacting Mike Pepper in Europe. Once the October Workshop agenda is finalized, it should be sent to both of them.	CB/BQ
Follow-up on membership with Gasunie.	AM had a meeting with them in Brussels. AM should send them the new Briefing Paper on gas.	AM
Contact GE Energy (Yves Menat) to follow up on potential membership.	CB met Emmanuel Kerrand (boss of Yves Menat), who was in favour of ETN membership. AM met with Mark Winkle who would discuss membership with Yves Menat. BQ to follow up with GE.	BQ
Produce new ETN banner.	Pending – to be finalised for October 2011.	CB
Follow up with Tanquy Poline, Air Liquide on the previously sent membership package.	Pending.	UK

Ask TC leaders to collect short courses within their TCs ahead of the Workshop	Ongoing – so far little response, but will ask again.	CB
BQ to contact Turbocare if they would rejoin. Possible contacts are Ed Stokkentreef and Fitz Degens.	Pending. CB met Helge Reymann from Turbocare (Turin) who was positive towards membership. CB to follow up. AM to write to Frits de Jong (Netherlands).	BQ/CB/AM
Investigate alternative less costly options for WIKI hosting, and try to reduce telephone costs.	CB to do further research.	CB
Prepare draft IGTC-12 sponsorship package for the Board to consider at the June 2011 board meeting.	Done.	CB
Check IT options for web registration with tick box for AoA and IR	Done.	CB
Ask all users to prioritise the matrix topics, not only TC members.	Done, some responses still outstanding.	CB
Review one TC at each Board meeting and invite the Chairman to discuss progress.	Invite TC 3-4 (Chris Dagnall and Ron van Gestle) to the Board Meeting 14 October 2011.	CB
CB to circulate the final version of the ETN Position Paper on integrating renewables into the grid to the Board members, before publishing on the ETN website and sharing it with EU decision-makers.	Done.	CB
AM to circulate the updated scoping paper on gas to the Board by the end of April.	Discussed under agenda point 9 at meeting.	AM
Update the slides (Membership strategy to bring more users in) and circulate it to the Board for further comments.	Done.	CB
Contact ETN members who have not registered for the AGM/Workshop, to give them a summary of the discussions, and ask for their input.	Done.	CB
Review ETN mailing list (to ensure that all relevant contacts are included from each member organisation).	Done.	CB
CB to contact ETN user members to provide a list of their GT fleet in Europe.	Pending. CB to circulate the request to members. BQ suggested including the global GT fleet of ETN members as well.	CB
Circulate the draft of the Creative session report to the Board.	Pending. Need more input.	CB
Circulate call for ideas to ETN members ahead of the Workshop.	Teleconferences were held with the TC Chairmen on the topics.	CB