# Annual General Meeting & Workshop

## 14-15 March 2018

## Bucharest, Romania

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For ETN's 2018 Annual General Meeting (AGM) and Workshop in Bucharest, Romania, 69 participants joined and engaged in dynamic discussions on the ETN's activities over the past year, the proposed strategy for the future, as well as the opportunities and challenges the gas turbine industry is facing during the energy transition to 2030 and in a longer perspective to 2050.

Our host COMOTI kindly invited the ETN members for a site visit to the COMOTI facilities on 14 March, while the ETN Board and the Air Filtration Working Group held short meetings before the official start of the AGM. In the evening of 14 March, the AGM dinner took place at Caru' cu bere restaurant, hosted by COMOTI, where Olaf Brekke (Statoil) was awarded Member of the Year 2018 for his reliable and valuable support to the User Group initiatives, the Air Filtration Working Group, and his continuous commitment to ETN.

The annual ETN Activity Update and the AGM and Workshop presentations can be downloaded from our website. Please note that you need to be logged in to access these documents. If you do not yet have a user account, please send an email to info@etn.global.

## Annual General Meeting – 14 March 2018

### 1. Welcome and ETN President's speech

After confirming that the requisite quorum was present, Christer Björkqvist, ETN Managing Director introduced Bernard Quoix, President of the ETN Board/Total, who opened the meeting and welcomed the participants to the Annual General Meeting (AGM) before delivering the Annual Speech to the General Assembly. In his speech, B. Quoix specifically welcomed the 12 new members who had joined the association since the last AGM in Oberhausen in May 2017. ETN has now 110 members from 23 countries, covering Europe, Asia, Middle-East and North-America.

New ETN Members (2017-2018)

- ACTE (Belgium)
- Ahlstrom-Munksjö (Finland)
- AkerBP (Norway)
- AST Turbo (Switzerland)
- Aurelia Turbines (Finland)
- BP (United Kingdom)
- Capstone Turbine (USA)
- CERTH (Greece)
- FAIST (Germany)
- HiETA Technologies (United Kingdom)
- Mälardalen University (Sweden)
- TNB (Malaysia)

Bernard Quoix stated that we have to embrace the transition trend to a low-carbon society and be at the forefront of this change to enable environmentally sound turbomachinery technology with reliable and low cost operation throughout the energy transition. To successfully achieving these goals we need to bring cooperation to a new level, which is a key objective in the proposed strategy of ETN, Bernard Quoix concluded.

## 2. Approval of Minutes of the last Annual General Meeting

The minutes of the 14th Annual General Meeting, held on 10 May 2017, were accepted as a true record of the meeting and were approved by the General Assembly without comments.

## 3. Activity report and developments

Christer Björkqvist, started his presentation by thanking the Members of the Board, the Project Board and the IGTC Conference Advisory Board for their active involvement and productive efforts during the past year. He then summarised the status of ETN today, after the 2017 reorganisation and widening of the scope of ETN both from a coverage and geographical point of view. Highlighting the positive response to this he stated that ETN today as a result has an impressive 110 member organisations from 23 countries and three continents. A short progress report with regard to the EU's effort on creating an Energy Union with the goal to ensure that Europe has secure, affordable and climate-friendly energy was presented to the General Assembly, as well as the drivers from the user community: Decarbonisation; Digitalisation; and Decentralisation; to fuel innovation to achieve these targets. The main activities and achievements of the past year were then presented in more detail, highlighting the progress within the ETN Working Groups (Air filtration, Exhaust system; MGT) and within the ongoing projects (Bearing; Hot Corrosion; OMSoP; NexTower; PUMP-HEAT). A special attention was drawn to the positive development of the Engine Specific User Groups (SGT-A35 and LM2500) and to the increased interest and willingness by the user community to bring key issues to the ETN platform and to share data for common RCAs (Root Cause Analysis) for the benefit of the whole community.

## 4. Demonstration of the new ETN website

A short introduction of the ETN's new website www.etn.global was given by Noora Kilpinen, ETN, introducing the new elements for the website, such as a responsive design and the possibility to register for the ETN events directly on the website. Noora Kilpinen informed the attendees that the ETN office would send a new username and password to all the member representatives on our mailing list in the following week once the website would be live.

## 5. Strategy and way forward

Gary Lock, Frazer Nash and Member of the Board presented ETN's proposed strategy going forward, which is to strengthen the gas turbine industry and users' markets in all its facets by all necessary cooperative efforts and by optimising turbomachinery Research and Technology Development (RTD) in order to improve efficient and environmentally sound applications of turbomachinery systems. He also highlighted the importance of reliable and low cost operation to ensure a prosperous user community in order for everyone in the GT value chain to benefit from it. As such ETN should encourage and facilitate information exchange, research and technology development in areas of importance to the user community. He then described the three main pillars of ETN activities which are centered around: 1. Operational needs, issues and optimised operations to reduce CAPEX and OPEX; 2. Research and development to initiate and coordinate various types of collaboration schemes of interest to our members and to develop a long term vision with respect to research, validated technology, legislation and standards; ensuring reliability and availability within cost and environmental boundaries; 3. Monitoring energy policy and market trends parallel to an active involvement with the objective to develop and contribute to standards, as well as influencing R&D energy policy and legislation. He then elaborated on the different steps that the Board has developed to facilitate an implementation of our strategy, but concluded that most importantly we need an active involvement and contributions by all of our members

in order to truly be successful in achieving these objectives. The proposed strategy was approved by the General Assembly.

## 6. Financial report and budget

Herwart Hönen, ETN Treasurer/RWTH Aachen University presented the financial results of 2017, the planned budget for 2018 and a projection for 2019. For the result of 2017 he reported that the year-end expenses were 573,141 Euros compared to the budget of 581,700 Euros, which resulted in a positive balance of 8,559 Euros. With regard to the income he informed the General Assembly that we had budgeted for 587,200 Euros and the final revenues landed on 599,038, which is 11,838 Euros more than expected. The estimation for the 2017 year-end result was a positive balance of 5,500 Euros but as a result of lower expenses and slightly higher income in total we managed to achieve a net result of 25.897 Euros, Herwart Hönen reported. It is a very positive result as we can now use this surplus (25.897) as a provision for 2018 which will enable us to avoid a negative balance in the 2018 budget which was predicted at the last AGM a year ago. For the budget for 2018 the expected revenues are 655.700 Euros compared to the budgeted costs of 643.700, resulting in a positive balance of 12.000 Euros.

Herwart Hönen stated that we have a healthy economy but reiterated that with the predicted growth of ETN we also need additional income to ensure an equal high quality of service to our members. Even if a growth would mean more income from new members we would still need additional income either from projects, courses or meetings in order to continue to have positive results from 2019 and onwards. He also reported that ETN has submitted two EC project proposals in January 2018, but that these projects have not been taken into account in the planned budget for 2018 due to the uncertainty if either of them will be funded.

The budget for 2018 was approved by the General Assembly.

## 7. H2M Hydrogen to Magnum

Geert Laagland (Vattenfall) presented Vattenfall's and Statoil's joint project involving both hydrogen and CCS to convert one of the Magnum power plants three 440-megawatt CCGTs in Emshaven, Netherlands, to run on hydrogen by 2023. The plan is to convert natural gas sourced from Norway into hydrogen and carbon dioxide. The hydrogen would be used in the Magnum plant, and the carbon dioxide would be transported by a pipeline and stored in underground facilities of the Norwegian coast, allowing carbon neutral production.

## 8. Report from the Project Board

Peter Jansohn, Chairman of the ETN Project Board/PSI, presented the planned revision of ETN's R&D Recommendation Report. He stated that the Project Board had already received some requests from ETN members to put higher emphasises on the following topics: low carbon solutions; integrated systems; additive manufacturing; digital solutions; storage solutions and decentralised systems. To draft and integrate the new edition of the Recommendation Report will be one of the initial tasks of the Project Board, to be nominated by the newly elected ETN Board in April 2018. He also stated that any input and suggestions by the General Assembly are more than welcome.

## 9. Technical Committee activity updates

The Technical Committee Chairpersons gave updates on ETN's projects and activities from the past year, as well as new initiatives that would be addressed during the second day of the Workshop in individual TC sessions – see the ETN Activity Update 2017-2018.

## 10. Election of the new ETN Board 2018-2020

Before discharging the 2016-2018 Board, Christer Björkqvist thanked the Board of Directors for their dedication and hard work during the past two years. He also dedicated a special thank you to Herwart Hönen and Giovanni Cerri for their time and support as members of the ETN Board since the launch of ETN in 2005, as they at the end of 2018 enter into retirement. Both received a standing ovation by the General Assembly.

The following candidates were elected by the General Assembly as Board of Directors for 2018-2020:

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| **Bernard Quoix**<br>Total | **Catherine Goy**<br>Uniper | **Manfred Aigner**<br>DLR - German Aerospace Center | **Mick Conway**<br>RWG Repair & Overhauls | **Bram van Cauwenberge**<br>ENGIE |
|  |  |  |  | |
| **Gary Lock**<br>Fraser Nash | **John Oakey**<br>Cranfield University | **Aristide Massardo**<br>University of Genoa | **Andy Williams**<br>Chromalloy | |

## 11. Member of the Year 2018

During the AGM dinner, Olaf Brekke (Statoil) was awarded Member of the Year 2018 for his reliable and valuable support to the User Group initiatives, Air Filtration Working Group, and his continuous commitment to ETN. The two other nominees were Pascal Decoussemaeker (GE Power) for his active involvement in TC4&5 and initiation of the Best Practice Award, and Rob Bastiaans (Eindhoven University of Technology) for his active participation in the TC2, his involvement in the IGTC-18 Conference Advisory Board and especially for setting up the Ammonia Interest Group.

## 12. Adjournment

The meeting was adjourned at 17:30 EET.

# ETN Workshop summary: 15 March 2018

## Opening session

COMOTI President and General Manager Valentin Silivestru welcomed the participants and introduced COMOTI's organisation and research activities. The Workshop continued with presentations "Optimisation of Operations to meet Current and Future Market Requirements" given by Simon Balmer (Uniper), "OEM R&D activities on gas turbines" presented by Alessio Miliani (BHGE) and "Enel experience in Gas Turbine Maintenance and Diagnostics" demonstrated by Giacomo Tirone (Enel), followed by ETN Technical Committee meetings.

## 1. TC1 - Low Carbon Gas Turbine Operation

K. Atsonios presented the project "Sustainable and Novel fuel cell applications for Island Energy Systems", funded by the "NSRF – Bilateral Research and Innovation Cooperation Greece-Germany". He stated that the main objectives of the project are:

- To provide the operability of a Hybrid-SOFC-System prototype (250 kWe) under specific fuel and load conditions;
- To develop new SOFC concepts for island applications:
    - highly flexible "base concept" composed of a SOFC +Micro-GT (MGT)
    - highest efficiency "Triple Cycle Concept" (SOFC+MGT+ST)
- To make a feasibility assessment of a reversible SOFC/SOEC concept on medium to large scale island applications;

K. Atsonios highlighted that the project is in line with the EU research and innovation programmes focusing on the development of new island energy systems to reduce the current dependence on oil fuels.

With regards to the ETN position on future carbon free energy, M. Assadi introduced the topic highlighting the need for a common strategy within the ETN community. The strategy should identify the drivers that would push for the development of new technologies in the EU energy scenario. The conclusion was that given the "Mission Innovation" portfolio and the clean energy and R&D focus in the EU Commission's soon announced Framework Programme 9, ETN should verify what solution(s) could be pushed forward and the required budget for each initiative. We would need to argue what technology (hydrogen, supercritical $CO_2$, bio fuels, $CO_2$ capture, energy storage, basic energy research, etc.) we think would bring us closer to "delivering the mission".

It was emphasised that in the short-term (10-15 years' time), business models in the GT sector will not change. Business models in the energy sector are more likely to change in order to reach the 2050 targets. The TC1 members agreed that building up business models could also be helpful to develop a strategy in the ETN community. The Horizon 2020 call "LC-SC3-CC-2-2018: Modelling in support to the transition to a Low-Carbon Energy System in Europe", under which an ETN proposal could be submitted, was discussed, where also other stakeholders in the energy scenario could be brought into the consortium.

After the lunch break, TC1 members joined the TC2 members and a discussion took place regarding the Horizon 2020 call. It was agreed that the ETN office should check the interest of the members on the call and coordinate a consortium if enough interest is shown.

| No | New Actions | Resp. | Deadline |
|---|---|---|---|
| **1** | ETN to verify the interest of the members to submit a project proposal under the call "LC-SC3-CC-2-2018: Modelling in support to the transition to a Low-Carbon Energy System in Europe" | ETN office | May |

## 2. TC2 - Operational and Fuel Flexibility

### Gas quality standards – CEN SFGas GQS Working Group

C. Goy provided an update on the ongoing action by CEN, the European Committee of Standardisation, to come up with a new and more complete standard to define natural gas composition, depending on certain parameters. This standard will be important for different applications ETN relies on, and for the safe supply of natural gas of a certain specified quality, so that the operational components would not be jeopardised.

A pre-normative study is currently being performed by the working group in charge of this standard. This study is on the phase of collecting information about the state of the art of rules and requirements in the different participating countries, and the effect on different applications, grouped into 5 sectors: domestic; industry; power generation; small scale decentralised & large scale centralised; and transportation.

C. Goy stated that this working group is looking for as much input as possible for a survey they recently sent out. ETN Office will circulate this survey and ETN Members will be invited to participate.

### ETN Ammonia Interest Group

R. Bastiaans provided an update on the Ammonia Combustion Interest Group activities. Methane, hydrogen and ammonia are individually all possible energy carriers to store energy surplus from renewables. This interest group was launched after the ETN Workshop in Genoa, and is still in its early stage. As a next step, the Interest Group would prepare a paper to describe the objective and future activities of the group, as well as the strategy of this interest group within ETN. All ETN members are invited to join the group.

Other activities that exist in this field:

- A study carried out by the Royal Society in UK ("Options for low carbon ammonia at scale");
- "NH3 event" will take place in Rotterdam 17-18 May that any members of the group could attend. R. Bastiaans will be present and report from this event;

### Power to X

P. Jansohn suggested limiting the "X" rigorously to chemical energy carriers, and avoiding using it for heat – as it can be seen sometimes.

The X would then represent either:

- Gas : hydrogen, methane, ammonia
- Liquid fuels

**CO2 Capture hub creation in Greece, and Power-to-X scheme**

K. Astonios presented an individual project and study carried out in Greece about carbon capture and use in a power-to-X scheme, with X being methanol. An economic study was done to evaluate how much methanol would be produced by such process, and how much it would approximately cost. The results show that the "Green" methanol would be produced at almost twice the cost of conventional methanol, but the premium price of 334€/t seems to be possibly justified by carbon saving. It was noted that it is not a net carbon reduction, as the carbon is probably released again when the methanol is used.

The results were considered encouraging enough, as they are planning for the construction of a middle scale power plant in Macedonia – 500 kW electrolysis system, to produce 200t/y of methanol. A sensitivity analysis was also carried out to assess the impact of several parameters, such as the cost of electricity, the price of $CO_2$ emission, etc.

K. Atsonios told the audience that the ETN community would be informed about the progress of the project and its developments in the future.

| No | New Actions | Resp. | Deadline |
|---|---|---|---|
| **1** | To provide input to the CEN SFGas GQS Working Group survey 1b: "Legislation for Emissions, Efficiency, Safety and Maintenance" to provide a good overview for the study | ETN members | Spring 2018 |
| **2** | To make the CEN presentations, which were sent by email to the members of this group, accessible also for the ETN members | C. Goy, ETN office | May |
| **3** | To make updates from CEN SFGas and a link to the survey available on the ETN website | C. Goy, ETN office | May |
| **4** | Strategy of the Ammonia Interest Group to be elaborated in a proposal | R. Bastiaans | Prior to the AGM 2019 |

## 3. TC3 - Material Degradation, Repair Technologies and Manufacturing

During the last ETN Workshop in Genoa in October 2017, TC3 focused its attention on three key initiatives:

1. Additive Manufacturing
2. Hot Corrosion
3. UK-US Collaboration

Additional information, report on progress or lack of progress and the best way forward was discussed during the meeting in Bucharest. The opportunity to initiate a project on Component Life Management was also considered.

**Component Life Management**

1. This discussion arose following the AGM and Workshop presentations by Uniper, Enel and BHGE, all of which talked about the drive towards condition based maintenance. In order to optimise the maintenance periods a good understanding of the component integrity is required. There are a number of generic models and also specific lifing processes in the market, but there is nothing that can be considered as a standard.

Discussion surrounded the generation of a potential standard and the creation of an IT access based system which would assist with this process. Total explained that some work had been done on this previously by the CBM proposal consortium, where the goal was to develop a customisable CBM tool, tailored to the needs of the users and the plant it will be applied. However, lack of funding prevented this project from moving forward.

**UK-US Collaboration**

1. J. Oakey reviewed the progress of this initiative since the Genoa meeting, reiterating that there are currently 6 work streams which could benefit ETN members.
    i. Corrosion in Supercritical fluids
    ii. Computational corrosion modelling for fuel flexible turbines
    - New coating test opportunities
    iii. Sensors and NDE
    - 3D microstructural characterisation of thermal properties of TBCs as a function of life
    iv. Micro turbine activities
    v. Additive Manufacturing and Repair
    vi. Materials
2. The next Collaboration meeting is to be held in Pittsburgh on 10-11 April. Each session will last about 1.5 hrs where the participants would be given an opportunity to present their on ongoing work and where they would like to contribute going forward.

**Hot Corrosion**

1. An update on the initiation of the hot corrosion project and the ongoing collection process of issues from the user community was provided. Although the group believe there should be a lot of interest for this topic by the user community only one or two companies have signed up to provide samples, J. Oakey reported. Enel announced that they were also interest in supporting this initiative as they currently have HC issues on a plant in Argentina.

**Additive Manufacturing**

1. AM has been gathering pace over recent years, and ETN believes it to be a major process within our Industry for the coming years. As a result, the group decided to include it as part of the groups' strategic vision in order to influence the industry and guide our members on this technology. AM has a high importance and we need to evaluate how we best can move this project forward, A. Williams stated. The presentation provided by Chromalloy detailed where the industry is in terms of design standards and concepts and highlighted the variety of models and initiatives currently in process. A good discussion was held albeith with limited people. Total, BHGE and ENEL all showed an interest in collaborative activities in this field. It was also highlighted that both Engie and Uniper have previously expressed interest in this field so it was agreed that there was room for further discussions. A meeting will be held with all key potential partners to decide how we move this technology forward and create a collaborative project. R. van Gestel will put together an initial presentation, reviewing the technology and setting the scene for discussion.

| No | New Actions | Resp. | Deadline |
|---|---|---|---|
| **1** | To draft a one page overview on Component Life Management standard and to circulate to the User community to see if there is any interest in developing a consortium project | J. Oakey, A. Williams, ETN office | May |
| **2** | All interested parties should let J. Oakey know if they want to be involved in the next US-UK Collaboration meeting in Pittsburgh | ETN members | April |
| **3** | ETN to follow up on the Hot Corrosion collection process with the User community | ETN office | June |
| **4** | Additive Manufacturing meeting to be held with all key potential partners to decide how we move this technology forward and create a collaborative project. R. van Gestel to put together an initial presentation, reviewing the technology and setting the scene for discussion. | R. van Gestel, ETN office | May |

## 4. TC4&5 - Condition Monitoring, Instrumentation and Asset Management

### Best Practice Award

The meeting was started by reviewing the Best Practice Award submissions, and then the group discussed how to motivate and ensure a continued success of the award.

### Digitalisation

The TC4&5 members reviewed the current White Paper on digitalisation, linking topics to the Workshop's morning presentations. Discussion then continued with the maturity model and implementation process.

Maturity model

During the last meeting in Genoa, the TC4&5 members carried out a brainstorming and gathered the items that should appear in the maturity model. The members rephrased the items to the questions that could be answered on a scale from 1 to 5, being able to evaluate the items. The TC4&5 participants then sorted the items by categories and divided them under two different dimensions, technology and government, following also the literature that had been reviewed.

- Technology dimension: this concerns the data, and figuring out its quantity and connectivity. The data is then connected to the users or to the applications, which basically implies the data infrastructure itself. The next point would be to decide on t what to do with the data; how to use it and how to analyse it.
- Government dimension :
    - *Leadership* to support such an initiative, where the use/business cases state what should be achieved. Providing the vision for such an initiative falls as well under the Government dimension

- *Organisation* of existing processes and how to get the users to accept the system.

The next step would be to include these points in the paper and circulate it to the ETN members for their comments.

Implementation model

The last part of the discussion was about the implementation model on digitalisation in all kind of industries, not specifically in the power industry, and how the model could be simplified for our gas turbine based industries. This would be added to the last chapter of the White Paper, prior to the circulation to ETN members in order to produce the second version of the paper.

P. Decoussemaeker announced that an abstract on the White Paper on Digitalisation has been accepted for the International Gas Turbine Conference 2018, and the final paper would be published and presented at the conference in October.

| No | New Actions | Resp. | Deadline |
|---|---|---|---|
| **1** | To update the White Paper chapters: maturity and implementation | P. Decoussemaeker | May |
| **2** | To circulate the White Paper to ETN members for their review | ETN office | May |

## Annex: List of Participants

| # | First Name | Last Name | Company |
|---|---|---|---|
| 1 | Francesco | Anzelini | ADNOC |
| 2 | Marco | Ruggiero | BHGE |
| 3 | Alessio | Miliani | BHGE |
| 4 | Giovanni Sergio | Barbieri | Boldrocchi |
| 5 | Richard | Ringstroem | Camfil Power Systems |
| 6 | Radu | Anghel | Capstone Turbine Corporation |
| 7 | Konstantinos | Atsonios | CERTH/CPERI |
| 8 | Andy | Williams | Chromalloy |
| 9 | Jafar | Alzaili | City, University of London |
| 10 | Gheorghe | Fetea | COMOTI |
| 11 | Bogdan | Gherman | COMOTI |
| 12 | Ionut | Porumbel | COMOTI |
| 13 | Valentin | Silivestru | COMOTI |
| 14 | Ramona | Stanciuc | COMOTI |
| 15 | Leonard | Trifu | COMOTI |
| 16 | Valeriu | Vilag | COMOTI |
| 17 | Yiguang | Li | Cranfield University |
| 18 | John | Oakey | Cranfield University |
| 19 | Rob | Bastiaans | Eindhoven University of Technology |
| 20 | Giuseppe | Messina | ENEA |
| 21 | Giacomo | Tirone | Enel |
| 22 | Christer | Björkqvist | ETN |
| 23 | Noora | Kilpinen | ETN |
| 24 | Ilona | Kolb | ETN |
| 25 | Valentin | Moëns | ETN |
| 26 | Ugo | Simeoni | ETN |
| 27 | Alessandro | Moscatelli | Flame Spray |
| 28 | Nicolas | Billiard | Fogale nanotech |
| 29 | Gary | Lock | Frazer-Nash Consultancy |
| 30 | Pascal | Decoussemaeker | GE Power |
| 31 | Peter | Griebel | German Aerospace Center (DLR) |
| 32 | Magnus | Genrup | Lund University |
| 33 | Valentina | Zaccaria | Mälardalen University |
| 34 | Sven - Hendrik | Wiers | MAN Diesel & Turbo |
| 35 | Marius | Dogaru | MAN Diesel & Turbo |
| 36 | Wolfgang | Schneiderbauer | MAN Diesel & Turbo |
| 37 | Amir | Poursamad | MAPNA |
| 38 | David | Hemsley | Oxsensis |
| 39 | Peter | Jansohn | Paul Scherrer Institute (PSI) |

| | | | |
|---|---|---|---|
| 40 | Sebastien | Pierlot | PW Power Systems |
| 41 | Alexandra | Simmonds | RINA Consulting |
| 42 | Sayyed Benyamin | Alavi | Roma Tre University |
| 43 | Giovanni | Cerri | Roma Tre University |
| 44 | Leila | Chennaoui | Roma Tre University |
| 45 | Herwart | Hönen | RWTH Aachen University |
| 46 | Giulio | Grassi | Sesta Lab |
| 47 | Adnan | Eroglu | Siemens |
| 48 | Uwe | Kaltwasser | Siemens |
| 49 | Sebastiaan | Ruijgrok | Siemens Heat Transfer Technology B.V. |
| 50 | Pierre | Brousse | Solar Turbines |
| 51 | Olaf | Brekke | Statoil |
| 52 | Dominique | Orhon | TOTAL |
| 53 | Bernard | Quoix | TOTAL |
| 54 | Ayyan | Bari | TransCanada Turbines |
| 55 | Simon | Balmer | Uniper |
| 56 | Catherine | Goy | Uniper |
| 57 | Peter | Asplund | United Services Sweden |
| 58 | Mohamed | Pourkashanian | University of Sheffield |
| 59 | Mohsen | Assadi | University of Stavanger |
| 60 | Tudor | Prisecaru | University Politehnica of Bucharest |
| 61 | Geert | Laagland | Vattenfall |
| 62 | Dirk | Kusters | VBR Turbine Partners |
| 63 | Ignacio | Lescano Carrol | VBR Turbine Partners |
| 64 | Jan | Slagter | VBR Turbine Partners |
| 65 | Sjirk | Van Der Goot | VBR Turbine Partners |
| 66 | Mark | Endrulat | W.L. Gore & Associates |
| 67 | Timon | Huber | W.L. Gore & Associates |
| 68 | Arjen | Hogenelst | Xenergy Services |
| 69 | Henk | Van Den Berg | Xenergy Services |