

Report of the CAETS Visiting Committee to the Pakistan Academy of Engineering Karachi, Pakistan – May 1-2, 2018

Introduction

By letter to CAETS Secretary/Treasurer Ruth David, dated April 14, 2017, the President of PAE, Dr. -Ing. Jameel Ahmad Khan, asked that PAE be considered for membership in CAETS. The letter included as an attachment a copy of the Memorandum of Association of The Pakistan Academy of Engineering which delineates PAE Aims and Objects, By-laws, selection criteria for Fellows, functions of the Assembly (the highest decision-making body), and composition of the Council (provides day-to-day management of the PAE). Additional information relating to PAE qualifications for membership, including a summary of activities and audited financial statements is provided on the PAE website (www.pacadengg.org). In advance of the visit to the PAE, biographies of all Fellows were provided for review.

PAE President Dr. -Ing. Jameel Ahmed Khan has demonstrated sustained interest in CAETS activities, having attended CAETS Council Meetings as an observer in 2015 (Delhi, India), 2016 (London, UK), and 2017 (Madrid, Spain).

On-Site Due Diligence

The visit to the PAE headquarter in Karachi, Pakistan, took place May 1-2, 2018. CAETS representatives involved were Prof. Dr. Frank Behrendt (acatech, CAETS Board Member) as onsite visiting representative together with Eng. Lucio Cáceres (ANIU, CAETS President) and Dr. Ruth David (CAETS Secretary/Treasurer) who participated via teleconference.

Brief Summary of Agenda Highlights

PAE was represented by its President, Dr.-Ing. Jameel Ahmad Khan, as well as several members of its Council, the Executive Board and additional Fellows of the academy, including: Dr. Shahid Alam, Dr. Nasim A Khan, Dr. Afzal Haque, Dr. Noorullah Soomro, Dr. M. Imran Aslam, Dr. Azal Haque (Vice Chancellor of Sir Syed University), Dr. Mushahid H. Hashmi (Chairman Automotive Engineering Department, NED University), Dr. Ahmad Hussain (Director ORIC, SZABIST University), Mr. Nadeem Arif (Secretary Outreach Committee, PAE). The majority of the persons listed above attended the meeting continuously and were actively engaged in the discussions.

The full agenda for the visit is provided in Appendix A.

The meeting began with an introduction of the PAE Fellows present and a description of the background and history of the academy by PAE President Jameel Ahmad Khan. PAE was registered on December 20, 2013 as a Society under Pakistan's Societies Registration Act XII of 1860. On March 5, 2014, The Pakistan Academy of Engineering Endowment Fund was registered as a Trust under the Pakistan Trust Act of 1882. The Trust was established to do all acts and deeds required for efficient management of the PAE Endowment Fund so that sufficient resources are available to the PAE to carry out its objectives. Both entities filed for registration as non-profit organizations. The PAE expects the process of recognition to be completed at the end of the current financial year.¹ Further details with respect to the

¹ See ADDENDUM: Certifications granted May 8, 2018

financial situation of PAE will be discussed in the context of qualifications for membership in part f of this report.

The atmosphere of this two-day meeting was very open and friendly. All information and materials requested by the CAETS representative were supplied promptly, and questions were answered exhaustively. Consequently, it can be stated that based on the information supplied both prior to and during the visit, a solid foundation was established for the recommendation provided in the concluding section of this report.

The discussion between PAE and the CAETS representative followed the criteria for membership as defined in the CAETS Bylaws. Key elements of this discussion are summarized below.

Summary of PAE Qualifications for CAETS Membership

In accordance with CAETS Bylaws, Article 2 – Council Membership; Section – Criteria for Membership: A member of CAETS shall:

Be representative of the engineering and technological community of that country;

In accordance with Article 2 of its Memorandum of Association, PAE aims to promote the advancement of science, art, and practice of engineering for the benefit of Pakistan. It aims to be a national forum for discussions around these topics, and to give independent advice on them. These are classic objectives of CAETS member academies. Additional information regarding PAE’s past and planned programs and activities is provided in part e.

PAE’s fellowship is comprised of representatives from academia as well as industry. The biographies of the current fellows show that many of them are, or have been, in influential positions in engineering in both sectors. As one example, PAE’s current president has been the chairman of the Pakistan Engineering Council and the President of the Pakistan Chamber of Engineers for six years each. Both bodies represent Pakistan’s engineering profession across all disciplines. The current PAE fellowship reflects the breadth of engineering specialization in Pakistan, as evidenced by the biographies reviewed.

PAE clearly fulfills the requirement of this part of CAETS’s Bylaws.

Subscribe to the nonpolitical, non-governmental international character of the Council;

PAE’s only source of funds at present is the above-mentioned Pakistan Academy of Engineering Endowment Fund, a non-profit organization. This is motivated and justified by the academy’s wish to stay clear of governmental financing to avoid any kind of dependency. This allows PAE to fulfill the non-political, non-governmental character to be honored by all CAETS member academies.

PAE also has demonstrated international engagement through its interactions with Industry, Associations, Consultants, Government agencies, Academia & Engineering bodies. *A list summarizing organizational interactions is provided in Appendix B.*

PAE clearly fulfills the requirement of this part of CAETS’s Bylaws.

Have a peer elected membership with criteria for election based on significant personal contributions to engineering, technological sciences, or related activities;

PAE Membership is by invitation only, based on clear criteria requiring candidates to have at least a PhD in engineering or equivalent degree from a recognized institution. Further, in accordance with PAE By-Laws, Article 4, “the fellowship shall be interpreted to include important or unusual personal contributions or accomplishments and may be in specific technical areas, in the integration of technologies, in the noteworthy leadership of a group involved in significant innovation of technological progress and as may be further interpreted by the Academy from time to time.” It is expected that the Fellows together cover all relevant fields of engineering. Foreign Fellows may not constitute more than 20 percent of the membership.

The current number of Fellows is 37. PAE expects to grow steadily in the coming years until the total number of 100 set by PAE By-Laws is achieved. The annual growth rate should not exceed 25 fellows.

One aspect which needs to be better-aligned with respect to CAETS Bylaws is that currently PAE’S Council (President, one of the Founding Fellows of the academy as Vice-President, five Fellows elected by the membership, and the Executive Secretary as a non-voting member) elects new Fellows from the list of candidates nominated by current Fellows. The term “peer-elected membership” aims at having new Fellows elected by all existing Fellows rather than by a selected subset (e.g. Council). The future role of the Council with respect to the election could be one of a selection committee forwarding a list of vetted candidates to the full membership for vote. PAE’S leadership agreed to adopt this change and will submit a statement regarding this to CAETS. The formal adaptation of the By-Laws will be a multi-year effort due to the way the Pakistani administration deals with such matters.²

Be governed by its elected membership;

While the PAE’S Council was elected by the fellowship, membership in this body is currently for life, with the need for stability and continuity during the start-up period of the academy given as reason. The current Council is the driving force for the activities of the academy. PAE’S leadership agreed to adopt terms for Council members as well as rules limiting the number of terms to which a Fellow can be elected. A statement regarding the necessary change of the By-Laws will be submitted to CAETS.²

Appropriate term limits and rules also will be implemented for the PAE’S officers (President, Vice-President, etc.). Term lengths of 3 to 5 years will be discussed. Again, a statement regarding the necessary change of the By-Laws will be submitted to CAETS.²

Be engaged in significant activities demonstrating that its objectives are compatible with the objectives of CAETS;

PAE established a series of half-day symposia (typically three per year) functioning as key exchange mechanisms between academia, government and industry. Titles of recent symposia are (*a more comprehensive list of past and planned symposia is provided in Appendix C*):

- Innovative Thar Coal Value Chain (2017)
- Hydrogen, Carbon-Free-Fuel, Democratizing the Energy (2017)
- Cybersecurity - Where do we stand? (2017)

² See ADDENDUM Statement of Intent 14 May 2018; Adopted by PAE Assembly 4 August 2018

- Prospects of Mini Nuclear Power Plants in Pakistan (2018)

In addition to the series, five institutes (similar to, e.g., topical networks of fellows of acatech) have been established by PAE:

- The Institute of Technology Assessment and Transfer
- Centre for Advanced Energy Studies
- Water & Wastewater Technologies
- Institute of Manpower Dynamics
- Institute of Cybersecurity Management

In these institute/workgroups, Fellows of PAE and others generate reports, studies, and other publications relating to the respective topics.

PAE also employs a “Knowledge Forum” model to share information relating to selected “Technology Alerts.” (*a summary of related activities is provided in Appendix D*).

PAE clearly fulfills the requirement of this part of CAETS’s Bylaws.

Have sufficient financial support to pay the costs of CAETS membership and the costs of participation in CAETS activities.

The above-mentioned Trust (Pakistan Academy of Engineering Endowment Fund) based on long-term commitments by engineering individuals for the basis for a sustainable operation of the academy. The application for being accepted as tax-free entity has been submitted for both the trust and the academy and is expected to be granted in the upcoming months.³

Currently, the trust pays for staff, rent, . of the academy to avoid a double taxation until the tax-free status is achieved. Audited financial statements are available on the academy’s website for both entities.

After receiving the tax exemption for both entities, the trust will act as money collector from supporters and “treasure chest” supporting the academy by transferring annual lump sums to it. The operational budget will then be within the Academy.

The expected annual budget of approximately \$50,000 to \$100,000 USD will be sufficient for a sustainable operation of PAE within CAETS’s framework.

PAE clearly fulfills the requirement of this part of CAETS’s Bylaws.

Recommendation to Council

On the basis of PAE’s presentations and subsequent discussions, with particular attention to its statutes, reputation, financial strength and impressive recent record, the CAETS Visiting Committee agreed that PAE fully meets the criteria for membership of CAETS (Section 3 of the Bylaws). The Committee concluded, therefore, that there is a compelling case for its election to CAETS at the meeting of Council on 13 September 2018.

³ See ADDENDUM: Certifications granted 8 May 2018

Appendix A. Agenda for Visit

Agenda for CAETS Team Visit to the PAE

CAETS Officers: Name: Mr. Lucio Caceres, President
 Name: Dr. Frank Behrendt, Board Member

Focal Person: Name: Dr.-Ing. Jameel Ahmad Khan
 Designation: President

Visit Scheduled On: May 1 & 2, 2018

Details of the Schedule:

May 1, 2018

ITEM	TIMING
• Arrival of CAETS Team at the PAE's Head Office	1300hrs
• Welcome of CAETS Team by the President, PAE	1305hrs – 1310hrs
• Introduction of CAETS & PAE team members and quick tour to the Academy Facility	1310hrs – 1330hrs
• Lunch Break	1331hrs – 1440hrs
• General Discussion by the CAETS team on the Criteria for the membership and the membership application	1441hrs – 1520hrs
• Introduction of PAE by Dr.-Ing. Jameel Ahmad Khan, President	1521hrs – 1600hrs
• Conduct of Business during the last four years by the Fellows of PAE (Dr. Shahid Alam, Dr. Nasim A Khan, Dr. Afzal Haque, Dr. Noorullah Soomro and Dr. M. Imran Aslam)	1601hrs – 1630hrs
• General Discussion with Council and Fellow members on the CAETS membership expectations for both CAETS and PAE including Feedback & Review	1631hrs – 1655hrs
Break before Video Telecom	1656hrs – 1659hrs
• Skype Call / Telecom with Mr. Lucio Caceres & Dr. Ruth A. David	1700hrs – 1830hrs
• Departure for Hotel	1845hrs

May 2, 2018

ITEM	TIMING
• Arrival CAETS Team at the PAE's Head Office	0930hrs
• Meeting with Dr. Azal Haque, Vice Chancellor of Sir Syed University	0930hrs – 1030hrs
• Meeting with Dr. Mushahid H. Hashmi, Chairman Automotive Engineering Department, NED University	1031hrs – 1130hrs
• Meeting with Dr. Ahmad Hussain, Director ORIC, SZABIST University	1131hrs – 1230hrs
• Meeting with Mr. Nadeem Arif, Secretary Outreach Committee, PAE	1231hrs – 1330hrs
Lunch Break	1331hrs – 1430hrs
• General discussion, review and feedback by CAETS team	1431hrs – 1645hrs
Break before Video Telecom	1646hrs – 1659hrs
• Skype Call / Telecom with Mr. Lucio Caceres & Dr. Ruth A. David	1700hrs – 1830hrs
• Departure for Hotel	1845hrs

Appendix B. – PAE Interactions

PAE is already interacting with Industry, Associations, Consultants, Government agencies, Academia & Engineering bodies.

This includes:

a. Industries (Mills, Constructors, Banks, Cybersecurity & Engineering Consultants, Firms etc.):-

1. Indus Motors Co. Ltd.
2. Merck (Pvt.) Ltd.
3. Thal Engineering
4. Cargill Pakistan Holdings (Pvt.) Ltd.
5. Sindh Engro Coal Mining Company (SECMC)
6. Principal Builders
7. Ravian Maritime (Pvt.) Ltd.
8. Sui Southern Gas Company Ltd.
9. McDonald's – SIZA Foods (Pvt.) Ltd.
10. EMC Pakistan (Pvt.) Ltd.
11. Nippon Steel & Sumikin Engineering Co. Ltd.
12. Chiyoda U Tech Co. Ltd.
13. Linde Pakistan Ltd.
14. M11 Group, Canada
15. Trend Micro
16. Bank Al-Habib Ltd.
17. Mr. Mohammad Irshad, Consultant Nuclear Power Plants, Lincoln, California, USA
18. Exponent Engineers (Pvt.) Ltd.
19. Osmani & CO.
20. Silicon Valley Builders, USA - (Mr. Mike Zaidi)
21. Mr. Shakeel Rahman, Consultant Operational Analysis, Health Care, USA
22. National Bank of Pakistan
23. Engineering Services Group, USA
24. Kia Lucky Motors Pakistan Limited
25. Technology Links (Pvt.) Ltd.
26. International Steels Limited
27. National Refinery Limited
28. EA Consulting (Pvt.) Ltd.
29. DHA Cogen Limited
30. Engineering Consultants International (Pvt.) Ltd.
31. Zishan Engineers (Pvt.) Ltd.
32. Pakistan Refinery Limited (PRL)
33. Habibullah Associates (Pvt.) Ltd.
34. MOORE STEPHENS – Shekha & Mufti Chartered Accountants
35. Qayi & Company Chartered Accountants

36. Lear Corporation - USA
37. Premier Systems (Pvt) Ltd.
38. Environmental Consultancy Services (ECS)
39. DICE Foundation – USA
40. MM Pakistan (Pvt.) Ltd.
41. Al-Abbas Printers
42. Friends Construction Syndicate (Pvt.) Ltd.
43. SOILMAT Engineers (SME)
44. Insight Engineering
45. House of Habib
46. ESS.IAAR (Planning, Engineering & Services Consultants)
47. Pakistan International Airline (PIA)
48. Japan Coal Energy Center (JCOAL)
49. SIEMENS Saudi Arabia
50. Habib Metropolitan bank Ltd.
51. Civil and Structural Engineering Consultants, Karachi
52. AAA Partnership (Pvt.) Ltd.
53. NESPAK Karachi Office

b. Academia & Agencies (Government/Private):-

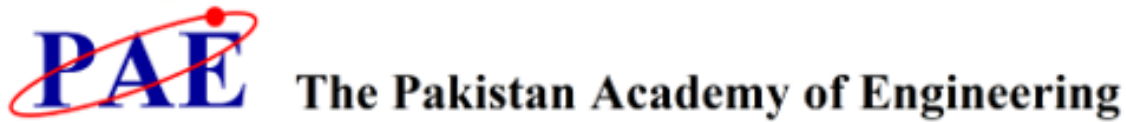
1. Institute of Applied Energy, Japan (IAE)
2. Pakistan Japan Business Forum
3. Pakistan Atomic Energy Commission (PAEC)
4. Pakistan Science Foundation (PSF)
5. Pakistan Scientific and Technological Information Centre (PASTIC)
6. National Engineering and Scientific Commission (NESCOM)
7. Indus University
8. NED University of Engineering & Technology (NEDUET)
9. Hamdard University
10. International Council of Academies of Engineering & Technological Sciences, INC. (CAETS)
11. Information Systems Audit and Control Association (ISACA)
12. The Citizens Foundation (TCF)
13. National University of Computer and Emerging Sciences (NUCES-FAST)
14. SZABIST University
15. Usman Institute of Technology (UIT)
16. GIK Institute of Engineering, Sciences and Technology
17. Sir Syed University of Engineering & Technology (SSUET)
18. Newports Institute of Communication & Economics
19. Dawood University of Engineering and Technology
20. Pakistan American Cultural Center (PACC)
21. Aviation Institute of Management (AIM)
22. PAF Karachi Institute of Economics and Technology (PAEF KIET)
23. SAARC Energy Centre
24. Asian Institute for Environmental Research & Energy (A-ENERGY)
25. Institute of Business Management (IBM)
26. Pakistan Workers Federation (PWF)

27. Medicell Institute of Higher Education & Training
28. Shehri-Citizens for a Better Environment (Shehri-CBE)
29. Jang Group of Newspapers
30. Nawa-i-Waqt Group
31. Thar Coal & Energy Board (TCEB)
32. Dept. of Physical Medicine and Rehabilitation JPMC Karachi
33. DHA Suffa University
34. Asia Pacific Union for Housing Finance (APUHF)
35. Pakistan Council of Scientific & Industrial Research (PCSIR)
36. Deutscher Akademischer Austauschdienst – German Academic Exchange Service (DAAD Pakistan)
37. Goethe-Institut Pakistan – German Cultural Center
38. National Organisation Wasserstoff - und Brennstoffzellentechnologie, Germany
39. Energy Dept. Govt. of Sindh
40. Karachi Development Authority (KDA)
41. NEDIAN Social Engineers Trust (NEDIAN SET)
42. Korea Atomic Energy Research Institute (KAERI)
43. Ummul Qura University, Makkah, Saudi Arabia
44. Mehran University of Engineering & Technology (MUET)
45. Pakistan Centre for Philanthropy (PCP)
46. National University of Sciences and Technology (NUST)
47. Space & Upper Atmosphere Research Commission (SUPARCO)

c. Consulates & Embassies:-

1. U.S. Consulate General Karachi
2. Consulate General of the Islamic Republic of IRAN Karachi
3. Consulate-General of Japan in Karachi

Appendix C. PAE Symposia



List of Symposia:

- **Symposium 1:**
Prospects of E-MOBILITY in Karachi
(December 20, 2014)

- **Symposium 2:**
Engineering and Health Care Nexus in Pakistan
(June 13, 2015)

- **Symposium 3:**
Industrial Renaissance and Competitiveness for Pakistan
(August 1, 2015)

- **Symposium 4:**
Drinking Water
(October 31, 2015)

- **Symposium 5:**
Coal-to-Liquids (CTL) Technology for Pakistan
(January 30, 2016)

- **Symposium 6:**
Additive Manufacturing
(July 30, 2016)

- **Symposium 7:**
Innovative Thar Coal Value Chain
(February 04, 2017)

- **Symposium 8:**
Hydrogen, Carbon-Free-Fuel, Democratizing the Energy
(July 01, 2017)



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- **Symposium 9:**
Cybersecurity – Where do we stand?
(December 16, 2017)
- **Symposium 10:**
Prospects of Mini Nuclear Power Plants in Pakistan
(April 28, 2018)
- **Symposium 11:**
Our Mineral Resources – The Most Neglected Sector
(November 03, 2018)
- **Symposium 12:**
Bioeconomy & Engineering Nexus
(March 02, 2019)
- **Symposium 13:**
Preparing for Our Digital Economy
(July 06, 2019)

Appendix D. Knowledge Forum



The Pakistan Academy of Engineering

Knowledge Forum

LIST OF PROGRAMMES

- 1. Wireless Power Transfer – Application in Hybrid – Electric Vehicles**
(October 03, 2015)
- 2. Digital Transformation**
(March 19, 2016)
- 3. Advances in Engineering Education**
(July 16, 2016)
- 4. Wind Farming in Pakistan**
(October 01, 2016)
- 5. Dematerialization and its impact on Industry**
(December 31, 2016)
- 6. Profile of the Future Engineer**
(September 23, 2017)
- 7. Business Strategy for Engineering Organizations in Pakistan**
(February 03, 2018)
- 8. Materials Science and Engineering of Epoxy Based Composites**
(May 05, 2018)