FRANO BARBIR, Ph.D.
Professor, Chair for Thermodynamics
Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
University of Split, R Boskovica 32, 21000 Split, Croatia
Tel. +385-91-4305-953; E-mail: fbarbir@fesb.hr ;

SUMMARY

- Held technical and managerial positions with major fuel cell companies.
- Proven track record in PEM fuel cell stack and system development (developed working fuel cell stacks and systems, 7 fuel cell patents).
- Program Manager/Principal Investigator on multi-million dollar R&D projects
- Introduced and taught Fuel Cell Engineering course at several universities in U.S. and abroad.
- Author of the book *PEM Fuel Cells: Theory and Practice*, Elsevier/Academic Press, 2nd ed. 2013.
- More than 200 publications in technical and scientific journals, books, encyclopedia, and conference proceedings.
- Editor Emeritus – *International Journal of Hydrogen Energy.*
- Ph.D. in Mechanical Engineering; M.Sc. in Chemical Engineering.

EDUCATION

- **Ph.D.** in Mechanical Engineering, Thermal and Fluid Sciences Program, specialized in Hydrogen Energy Systems, University of Miami, Coral Gables, Florida, 1992.
- **M.Sc.** in Chemical Engineering, Ecological Engineering Program, Zagreb University, Zagreb, Croatia, 1984.
- **Dipl.-Ing.** in Mechanical Engineering, Thermotechnical Engineering Program, Zagreb University, Zagreb, Croatia, 1978.

PROFESSIONAL EXPERIENCE

Current position

- **Professor**, Chair for thermodynamics, Head of Laboratory for New Thermo-Energy Technologies, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, Split, Croatia, (since October 2006)

Past positions

- **Academic Professional Lecturer** at the rank of Associate in the Department of Mechanical Engineering, University of Wyoming, Laramie, WY, U.S.A. (Spring semesters 2012 & 2013)
- **Associate Director** for Science & Technology, United Nations Industrial Development Organization – International Centre for Hydrogen Energy Technologies (UNIDO-ICHET), Istanbul, Turkey (July 2005 – January 2008)

- **Professor in Residence**, dual position at Connecticut Global Fuel Cell Center and Mechanical Engineering Department, University of Connecticut, Storrs, CT (October 2003 – August 2005)
- **Director of Fuel Cell Technology, Director of R&D and Chief Scientist**, Proton Energy Systems, Wallingford, CT (August 2001 – October 2003)
- **Vice President, Technology and Chief Scientist,** Energy Partners, West Palm Beach, Florida 1999-2001
- **Principal Research Engineer,** Energy Partners, West Palm Beach, Florida 1992-1999
- **Research Fellow,** Clean Energy Research Institute, University of Miami, Coral Gables, Florida, 1989-1999
- **Research Engineer**, Institute of Shipbuilding Industry, New Products Department, Split, Croatia 1985-1988
- **Project Engineer**, Project Office Termofriz, Split, Croatia 1978-1985

PROFESSIONAL/CONSULTING ACTIVITIES

- Consultant/Interim Director, Hydrogen South Africa, Catalysis Center of Competence, University of Cape Town, Cape Town, South Africa (2010-2011)
- Senior Consultant, United Nations Industrial Development Organization – International Centre for Hydrogen Energy Technologies (UNIDO-ICHET), Istanbul, Turkey (2008-2011)
- Consultant for new energy technologies, Split-Dalmatian County, participant in the EU Intelligent Energy Europe Project: Energy Actions and Systems for Mediterranean Local Communities (EASY) (2008-2009)
- International Consultant and Reviewer, participated in creation of the National Hydrogen and Fuel Cell Technologies Research, Development and Innovation Strategy, Department of Science and Technology, Republic of South Africa (2006-2007)
- Technical Advisor, Earthrise Capital, New York, (since 2008)
- Consultant – United Nations Development Programme (UNDP), Brazil (1998) – participated in GEF/UNDP Project on Fuel Cell Buses for Brazil.
- Consultant – Energy Institute "Hrvoje Pozar", Zagreb, Croatia (1997-98) – participated in Strategy of Energy Development of the Republic of Croatia, and National Energy Programs.

COMMITTEES AND BOARDS

- Chairman, States Representatives Group (representing Croatia), Fuel Cell and Hydrogen Joint Undertaking 2 (member since 2015; Chairman since Nov 2017)
- Member, Governing Board, Center of Excellence for science and technology – Integration of Mediterranean Region (STIM), University of Split (2015 –)
- Member, National Board for Science, Higher Education and Technological Development (2014 – 2016)
- Member, Science Awards Committee, Croatian National Parliament (2012 – 2016)
- Member of the Board of Directors, BICRO Croatian National Agency for Business and Innovations (2012 –2013)
- Member of the Council for National Innovation System, Republic of Croatia (2008-2010)

- Member of the Board of Directors, International Association for Hydrogen Energy (2008 –)
- Chairman, Awards Committee, International Association for Hydrogen Energy, (1997-2010)
- Member, Policy Advisory Board, Florida Solar Energy Center, Cape Canaveral, Florida (1996-2006)
- Member, Technical Advisory Board, Franklin Fuel Cells, Wayne, PA (2002-2004)

MEMBERSHIPS

- Member of the Croatian Academy of Technical Sciences (member since 2015)
- International Association for Hydrogen Energy (IAHE) (Member since 1992; Fellow since 2014, Vice-President since 2019)
- The Electrochemical Society (member since 1994)
- Croatian professional-scientific association for energy, mechanical engineering technologies and renewable energy sources (member since 2010)
- Croatian Association for Hydrogen Energy (Founder and President since 2007)

AWARDS, HONORS

- Award Hrvoje Pozar by Croatian Energy Society for exceptional contribution to energetic, 2016
- Croatian Annual National Science Award for technical sciences, 2012
- University of Split – Recognition Plaque for exceptional contribution to development of University through outstanding scientific educational and professional work, 2012

EDITORIAL ACTIVITIES

- Associate Editor – *International Journal of Hydrogen Energy*, Elsevier Science, (1997 – 2010); Subject Editor for fuel cells and electrochemical hydrogen production and storage; Editor Emeritus (since 2010)
- Member of the Scientific and Editorial Committee, *International Journal of Nuclear Hydrogen Production and Applications,* Inderscience Publishers (2004 – present)
- Member of the Editoral Board, EGE, EnergetikaMarketing, Zagreb, (1997 – present)
- Member of the Editorial Board *Journal of New Materials for Electrochemical Systems*, École Politechnique, Montreal, (1997 – 2002)
- Member of the Consulting Editorial Board, *Encyclopedia of Life Support Systems*, D.A.K. Al Gobaisi (ed.), EOLSS, London, (1995-96)

ORGANIZATIONS OF CONFERENCES AND WORKSHOPS

- Organizer, Low or Zero Emissions Mobility, Day 4 at Sustainable Energy Week, Split-Dalmatian County, FESB and University Department of Professional Studies University of Split, 7 July 2018
- Chairman, European Fuel Cell Forum 2015, Lucerne, Switzerland 28 June – 1 July

- Organizer, Short-Course and Workshop PEM Fuel Cell Catalyst and MEA Preparation and Characterisation, University of Cape Town, South Africa, 28-29 March, 2011.
- Co-Director, NATO Advanced Research Workshop, Energy Options Impact on Regional Security, Split, Croatia, 17-20 June 2009.
- Organizer and Chair, International Conference Hydrogen on Islands, Bol, Croatia, 22-24. October, 2008.
- Organizer and Chair, Hydrogen Islands, special session at 17th World Hydrogen Energy Conference, Brisbane, Australia, 15-19 June 2008.
- Organizer and Moderator, Panel Session "How Hydrogen Can Contribute to Meeting the Challenges of Climate Change and Energy", side event at UN ECOSOC, New York, 2. July, 2008
- Organizer and Chair, Hydrogen Islands Initiative, kick-off meeting, side event at RERINA Integration of Renewable Energy Technologies in Rural Insular Areas European Conference, Brussels, Belgium, 9-11 October, 2007.
- Co-Director, NATO Advanced Research Workshop on Sustainable Energy Production and Consumption and Environmental Costing, University of Naples, Naples, Italy, 4.-7. July 2007.
- Organizer and Moderator, Panel Session "Hydrogen Activities Around the World", side Event at UNIDO General Conference, Vienna, Austria, 3-7 December, 2007.
- Director, Expert Group Meeting on Development of advanced materials for hydrogen storage applications, UNIDO-ICHET, Istanbul, Turkey, 6.-7. April 2007.

TEACHING

At University of Split (2006 – present)

Undergraduate level

- Thermodynamics
- Measurements in Engineering (Thermal and Fluids)

Graduate level

- Heat and Mass Transfer
- Renewable Energy Sources and Sustainable Development
- Thermal Power Plants
- Fuel Cells

At University of Wyoming (2012-2013)

Undergraduate level

- Special Topics in Mechanical Engineering: Fuel Cells Engineering (Spring semester 2013)

Graduate level

- Special Topics in Mechanical Engineering: Fuel Cell Modeling (Spring semester 2012)

At University of Connecticut

Undergraduate/graduate level

- Special Topics in Mechanical Engineering: Fuel Cells Engineering (2002 - 2005)

At University of Miami

Undergraduate level

- Energy Conversion (1998)

Graduate level

- Intermediate Fluid Mechanics (1992)

MENTORING OF PhD STUDENTS

- Anamarija Stoilova, Faculty of Chemical Technology, University of Split, current
- Andrej Zvonimir Tomić, FESB University of Split, current
- Domina Cikatić Šanić, FESB University of Split, current
- Ivan Pivac, FESB University of Split, graduated in 2018
- Ivan Poljak, FESB University of Split, current (co-mentor)
- Željko Penga, FESB University of Split, graduated 2017
- Dario Bezmalinović, FESB University of Split, graduated 2015
- Ivan Tolj, FESB University of Split, graduated 2012

R&D PROJECTS

Projects with University of Split

- Research Activity Leader: STIM-REI, Center of Excellence for Science and Technology – Integration of Mediterranean Region, EU Structural Funds (ERDF) through Central Financing and Contracting Agency (SAFU), 2017-2022
- Work Package Leader: Giantleap, EC FCH Joint Undertaking (Horizon 2020), 2016-2019
- Work Package Leader: Automotive Derivative Energy System (AutoRE), EC FCH Joint Undertaking (Horizon 2020), 2015-2018
- Principal Investigator: Water and Heat Management and Durability of PEM Fuel Cells, Croatian Science Foundation, 2014-2018
- Project Leader: Research and Developent of Hydrogen Energy System in Conjunction with Renewable Energy Sources, EU Structural Funds (ERDF) through Central Financing and Contracting Agency (SAFU), 2014-2016
- Work Package Leader: System Automation of PEMFCs with Prognostics and Health management for Improved Reliability and Economy (SAPPHIRE) EC FCH Joint Undertaking (FP7), 2013-2016
- Work Package Leader: Development of Guidance Manual for LCA Application to Fuel Cells and Hydrogen technologies (HyGuide), EC FCH Joint Undertaking (FP7), 2010-2011
- Principal Investigator: Passive fuel cells with oxygen supply from air by natural convection, Croatian Ministry of Science, Education and Sports, 2007-2013
- Grant Recipient: Fuel cell stack thermal behavior, EU Marie Curie International Reintegration Grant, 2007-2009
- Grant Recipient: Investigation of operating parameters and flow field design on performance of PEM fuel cell, Croatian Foundation for Science, 2007-2008

Projects with UNIDO-ICHET

- Participant: NANOCOFC Enhancement of Research Capabilities on Multi-Functional Nanocomposites for Advanced Fuel Cell Technology through EU-Turkish-China Cooperation, EC FP6, 2006-07

Projects with Connecticut Global Fuel Cell Center

- Principal Investigator: PEM Fuel Cell for Navy Torpedo Applications, Design by Analysis, Inc. 2005
- Technical Program Manager: Micro/miniature fuel cells for portable applications (Phase II and III) U.S.Army, RDECOM, 2003-2005
- Principal Investigator: Comparison of PEMFC internal resistance measurement techniques, Lynntech Inc., 2004

Projects with Proton Energy Systems, Wallingford, CT

- Task Leader: Development and Demonstration of Fuel Cell Back-up Power System, Development of Fuel Cell Stack, Connecticut Clean Energy Fund, 2003
- Principal Investigator: Lightweight Unitized Regenerative Fuel Cell, NASA/SBIR Phase I, 2003
- Principal Investigator: Lightweight Hardware Design for Regenerative Fuel Cells, DOD/MDA SBIR Phase I, 2003

Projects with Energy Partners, West Palm Beach, FL

- Principal Investigator: High Performance, Matching PEM Fuel Cell Components and Integrated Pilot Manufacturing Process, 3M Company/ Department of Energy, 1999-2001
- Principal Investigator: High Performance, Low Cost Membrane Electrode Assemblies for PEM Fuel Cells, 3M Company/ Department of Energy, 1998-1999
- Program Co-Manager: Development and Delivery of a 20 kW PEM Fuel Cell Stack, Virginia Tech/U.S. Department of Energy, Future Car Challenge, 1999
- Co-Principal Investigator: Development of Advanced, Low Cost PEM Fuel Cell Stack and System Design for Operation on Reformate Used in Vehicle Power Systems, PRDA/U.S. Department of Energy – Office of Transportation Technologies, 1997-2001
- Principal Investigator: Development of Integrated Renewable Hydrogen Utility System, U.S. Department of Energy/Hydrogen Program, 1998
- Principal Investigator: Development of Advanced PEM Fuel Cell for Transportation, PRDA/U.S. Department of Energy – Office of Transportation Tech. 1996-98
- Principal Investigator: Evaluation of Gas Diffusion Samples, W.L. Gore & Associates, 1996
- Principal Investigator: R&D of Direct Hydrogen PEM Fuel Cell for Transportation Applications, Ford Motor Company/ U.S. Department of Energy, 1995-96
- Principal Investigator: Electrostatic Deposition of Catalyst on a Polymer Membrane for Fuel Cell Applications, National Science Foundation/SBIR Phase I, 1995
- Principal Investigator: Development of an Air-Open PEM Fuel Cell, Department of Defense/U.S. Army Research Laboratory/ SBIR Phase I, 1995

- Principal Investigator: US Hybrid Propulsion System Development, Ford Motor Company/ Department of Energy, 1994-95
- Program Manager: Development of a Bench-Top Fuel Cell Power System, VITO, Belgium, 1994

PUBLICATIONS

Books

1. F. Barbir, *PEM Fuel Cells: Theory and Practice*, 2nd updated and enlarged edition, Elsevier/Academic Press, Burlington, 2013. (ISBN 978-0-12-387710-9)
2. T.N. Veziroglu and F. Barbir, *Hydrogen Energy Technologies*, UNIDO - Emerging Technologies Series, United Nations Industrial Development Organisation, Vienna, Austria, 1998.

Edited Books

1. F. Barbir, A. Basile, T.N. Veziroglu, (Eds.), Compendium of Hydrogen Energy, Vol. 3 Hydrogen Energy Conversion, Elsevier/Woodhead Publishing, 2015. (ISBN 978-1-78242-363-8)
2. F. Barbir and S. Ulgiati, (Eds.), *Energy Options Impact on Regional Security*, NATO Science for Peace Series, Springer Verlag, Dordrecht, NL, 2010. (ISBN 978-9048195640)
3. F. Barbir and S. Ulgiati, (Eds.), *Sustainable Energy Production and Consumption: Benefits, Strategies and Environmental Costing*, NATO Science for Peace Series, Springer Verlag, Dordrecht, NL, 2008. (ISBN 978-1-4020-8492-8).

Chapters in Books and Encyclopedias:

1. F. Barbir, Primjena elektrokemijskog kompresora za recirkulaciju vodika u gorivnom članku, godišnjak Hrvatske akademije tehničkih znanosti, HATZ (2019)
2. F. Barbir, Hydrogen Islands - Utilization of Renewable Energy for an Autonomous Power Supply, in D. Stolten and B. Emonts, (Eds.), Hydrogen Science and Engineering: Materials, Processes, Systems, and Technology, Viley-VCH, 2015 pp.1075-1098
3. F. Barbir, Regenerative Fuel Cells, in J. Garche, C. Dyer, P. Moseley, Z. Ogumi, D. Rand and B. Scrosati (Eds.), Encyclopedia of Electrochemical Power Sources, Vol 3. Elsevier, Amsterdam, 2009. pp. 224–237.
4. F. Barbir, International Association for Hydrogen Energy, in C. Tietje and A. Brouder (Eds.) Handbook on Transnational Economic Governance Regimes, Brill Academic Publishing, Leiden, (ISBN: 978-90-04-16330-0) 2009. pp. 915-921
5. F. Barbir, Fuel Cell Basic Chemistry, Electrochemistry and Thermodynamics, in S. Kakac, A. Pramuanjaroenkij, L. Vasiliev (Eds.), Micro-Mini Fuel Cells – Fundamentals and Applications, Springer Verlag, NATO Science Series - C (ISBN 978-1-4020-8294-8), 2008, pp. 13-26
6. F. Barbir, Fuel Cell Stack and System Design Principles with Some Design Concepts of Micro-Mini Fuel Cells, in S. Kakac, A. Pramuanjaroenkij, L. Vasiliev (Eds.), Micro-Mini Fuel Cells – Fundamentals and Applications, Springer Verlag, NATO Science Series - C (ISBN 978-1-4020-8294-8), 2008, pp. 27-46

7. F. Barbir, Fuel Cells for Clean Power Generation: Status and Perspectives, in J. Sheffield and C. Sheffield (eds.) Assessment of Hydrogen Energy for Sustainable Development, Springer Verlag, NATO Science for Peace Series C (ISBN 978-1-4020-6440-1), 2007, pp. 113-121
8. S.A. Sherif, F. Barbir, T.N. Veziroglu, M. Mahishi, and S.S. Srinivasan, Hydrogen Energy Technologies, in F. Kreith and D.Y. Goswami, (Eds.), *Handbook of Energy Efficiency and Renewable Energy*, CRC Press/Taylor & Francis Group, Boca Raton, Florida, (ISBN 0-8493-1730-4), 2007, pp. 27.1-27.16.
9. F. Barbir, PEM Fuel Cells - Overview, in N.M. Sammes (ed.), *Fuel Cell Technology: Reaching Towards Commercialization*, Springer-Verlag, London, 2006, pp.27-52
10. S.A. Sherif, F. Barbir and T.N. Veziroglu, Hydrogen Energy Solutions, in N.L. Nemerow and F.J. Agardy (Eds.) *Envronmental Solutions*, Elsevier/Academic Press, Burlington, MA, 2005, pp.143-180
11. F. Barbir, System Design for Stationary Power Generation, *Handbook of Fuel Cell Technology – Fundamentals, Technology and Applications* , W. Vielstich, A.Lamm, and H. Gasteiger (eds.), Vol. 4, Part 3, J. Wiley, New York, 2003, pp. 683-692
12. F. Barbir, Hydrogen Energy (in Croatian), a chapter in *Obnovljivi Izvori Energije (Renewable Energy Sources)*, B. Labudovic (ed.), EnergetikaMarketing, Zagreb, Croatia, 2002, pp. 407-409
13. F. Barbir, S.A. Sherif and T.N. Veziroglu, Fundamentals of Hydrogen Energy Utilization, in *Advances in Solar Energy*, Y. Goswami and K. Boehr (eds.), Vol. 14, American Solar Energy Society, 2001, pp. 67-100
14. S.A. Sherif, F. Barbir, and T.N. Veziroglu, Hydrogen Energy System, in *Wiley Encyclopedia of Electrical and Electronic Engineering*, J.G. Webster (ed.), Vol. 9, pp.370-402, J. Wiley & Sons, New York, 1999
15. T.N. Veziroglu and F. Barbir, Transportation Fuel, Hydrogen, in *Encyclopedia on Energy Technology and the Environment*, A. Bisio and S.R. Boots (eds.), pp. 2712-2730, John Wiley & Sons, New York, 1995
16. T.N. Veziroglu and F. Barbir, Hydrogen: The Ultimate Fuel and Comparison with Fossil Fuels, in *The Future of Energy Gases*, D. Howell, (ed.), U.S. Geological Survey Professional Paper 1570, pp. 715-724, 1993

Journal Articles:

1. Q. Meyer, I. Pivac, F. Barbir, C. Zhao, Oxygen Diffusivity Evolution during Proton Exchange Membrane Fuel Cell Carbon Corrosion Captured Using Low-Frequency Electrochemical Impedance Spectroscopy, *Journal of Power Sources*, 470, 228285 (2020)
2. L. Xing, Z. Xu, Ž. Penga, Q. Xu, H. Su, W. Shi, F. Barbir A novel flow field design with controllable pressure gradient across adjacent channels to enhance mass transport and water removal of PEM fuel cells, *AICHE Journal*, 66:e16957, (2020)
3. I. Pivac and F. Barbir, Impact of Shutdown Procedures on Recovery Phenomenain Proton Exchange Membrane Fuel Cells, *Fuel Cells* Vol. 20, No.2, pp.185-195 (2020) DOI:10.1002/fuce.201900174

4. I. Halvorsen, I. Pivac, D. Bezmalinović, F. Barbir, F. Zenith, Low-Frequency Electrochemical Impedance Spectroscopy for PEM Fuel-Cell Diagnostics, *Intl. Journal of Hydrogen Energy* Vol. 45, pp. 1325-1334 (2019)
5. Z. Penga, C. Bergbreiter, F. Barbir, J. Scholta, Numerical and experimental analysis of liquid water distribution in PEM fuel cells, *Energy Conversion and Management*, Vol. 189, pp. 167-173 (2019)
6. S. Nižetić, F. Barbir, N. Djilali, Role of Hydrogen in Energy Transition, Editoral in *Intl. J. Hydrogen Energy* Vol. 44, No. 20 (2019) pp. 9673-9674
7. N. Matulic, G. Radica, F. Barbir, Commercial vehicle auxiliary loads powered by PEM Fuel Cell, *Intl. J. Hydrogen Energy*, Vol. 44, No. 20 (2019) pp. 10082-10090
8. Ž. Penga, G. Radica, F. Barbir, S. Nižetić, Coolant Induced Variable Temperature Flow Field for Improved Performance of Proton Exchange Membrane Fuel Cells, *Intl. J Hydrogen Energy*, Vol. 44, No. 20 (2019) pp. 10101-10119
9. F. Martinić, G. Radica, F. Barbir, Application Analysis of Solid Oxide Fuel Cells in Ship Energy Systems, *Brodogradnja/Shipbuilding*, Vol. 69, No. 4 (2018) pp 53-68
10. I. Pivac, D. Bezmalinović, F. Barbir, Catalyst Degradation Diagnostics of Proton Exchange Membrane Fuel Cells Using Electrochemical Impedance Spectroscopy, *Intl. Journal of Hydrogen* Energy, Vol. 43, No. 29, (2018) pp. 13512-13520
11. I. Poljak, P. Županović, F. Barbir, Measurement of Proton Concentration in PEM by Hall Effect, *Fuel Cells*, Vol. 18, No. 4, (2018), pp. 408-412
12. Ž. Penga, I. Pivac, F. Barbir, Experimental Validation of Variable Temperature Flow Field Concept for Proton Exchange Membrane Fuel Cells, *International Journal of Hydrogen Energy*, Vol. 42, No. 41, (2017) pp.26084-26093
13. I. Pivac, B. Šimić, F. Barbir, Experimental Diagnostics and Modeling of Inductive Phenomena at Low Frequencies in Impedance Spectra of Proton Exchange Membrane Fuel Cells, *Journal of Power Sources*, Vol. 365 (2017) pp. 240-248
14. M. Lototskyy, I. Tolj, L. Pickering, C. Sita, F. Barbir, V. Yartis, The Use of Metal Hydrides in Fuel Cell Applications, *Progress in Natural Science,* Vol. 27, No. 1, (2017), pp 3-20.
15. I. Pivac and F. Barbir, Inductive phenomena at low frequencies in impedance spectra of proton exchange membrane fuel cells –A review, *Journal of Power Sources*, Vol. 326, (2016) pp. 112-119
16. Ž. Penga, I. Tolj, F. Barbir, Computational fluid dynamics study of PEM fuel cell performance for isothermal and non-uniform temperature boundary conditions, *International Journal of Hydrogen Energy*, Vol. 41, (2016) pp. 17585-17594
17. D. Bezmalinović, B. Šimić, F. Barbir, Characterization of PEM fuel cell degradation by polarization change curves, *Journal of Power Sources*, Vol. 294, (2015) pp. 82-87
18. D. Bezmalinović, J.Radošević, F. Barbir, Initial conditioning of polymer electrolyte membrane fuel cell by temperature and potential cycling, *Acta Chimica Slovenica*, Vol. 62, No. 1, (2015) pp. 83-87
19. E. Özden, I. Tolj, F. Barbir, Designing heat exchanger with variable surface area for passive cooling of PEM fuel cell, *J. Appl. Thermal Eng*., Vol. **51**, No. 1–2, (2013), pp. 1339-1344

20. D. Bezmalinovic, F.Barbir I. Tolj, Techno-economic analysis of PEM fuel cells role in photovoltaic-based systems for the remote base stations, *Int. J. Hydrogen Energy*, Vol. **38**, No. 1, (2013) pp. 417-425
21. I. Tolj, D. Bezmalinovic, F.Barbir, Maintaining desired level of relative humidity throughout a fuel cell with spatially variable heat removal rates, *International Journal of Hydrogen Energy*, Vol. **36**, No. 20, (2011) pp. 13105-13113
22. O. Atlam, F. Barbir, D. Bezmalinovic, A Method for Optimal Sizing of an Electrolyzer Directly Connected to a PV Module, *International Journal of Hydrogen Energy* Vol. 36, No. 12, (2011) pp. 7012-7018.
23. F. Barbir, Transition to Renewable Energy Systems with Hydrogen as an Energy Carrier, *Energy*, Vol. **34**, No. 3 (2009) pp. 308-312.
24. F. Barbir and S. Yazici, Status and Development of PEM Fuel Cell Technology, *Int. J. Energy Research*, Vol. **32** No. 5 (2008) pp. 369-378
25. F. Barbir and H. Gorgun, Electrochemical Hydrogen Pump for Recirculation of Hydrogen in a Fuel Cell Stack, *Journal of Applied Electrochemistry* Vol. **37**, No. 3, (2007) pp. 359-365
26. H. Görgün, M. Arcak and F Barbir,. An Algorithm for Estimation of Membrane Water Content in PEM Fuel Cells. *J.Power Sources*, Vol. **157**, No. 1, pp. 389-394. 2006
27. F. Barbir, H. Gorgun and X. Wang, Relationship Between Pressure Drop and Cell Resistance as a Diagnostic Tool for PEM Fuel Cells, *J. Power Sources,* Vol. **141**, No. 1, pp. 96-101, 2005
28. F. Barbir, T. Molter and L. Dalton, Efficiency and Weight Trade-off Analysis of Regenerative Fuel Cells as Energy Storage for Aerospace Applications, *International Journal of Hydrogen Energy* Vol. **30**, No. 4, pp. 231-238, 2005
29. F. Barbir, T. Molter and L. Dalton, Regenerative Fuel Cells as Energy Storage: Efficiency and Weight Trade-offs, *IEEE Aerospace and Electronic Systems Magazine*. Vol. **23**, No. 3, pp. 35-40. 2005
30. F. Barbir, PEM Electrolysis for Production of Hydrogen from Renewable Energy Sources, *Solar Energy*, Vol. **78**, No. 5., pp. 661-669, 2005
31. S.A. Sherif, F. Barbir and T.N. Veziroglu Wind energy and the hydrogen economy—review of the technology *Solar Energy*, Vol. **78**, No. 5., pp. 647-660, 2005
32. S.A. Sherif, F. Barbir and T.N. Veziroglu, Towards a Hydrogen Economy, *Electricity Journal*, Vol. **18**, No. 6, pp. 62-76, 2005
33. F. Barbir, Fuel Cells and Hydrogen Economy, *Chemical Industry & Chemical Engineering Quarterly* (ISSN 1451-9372), Vol. **11**, No. 3, 105-160, July-September 2005
34. F. Barbir, S.A. Sherif and T.N. Veziroglu, Principles of Hydrogen Energy Production, Storage and Utilization, Special Issue of the *Journal of Scientific and Industrial Research* January-February, Vol. **62**, pp. 46-63, 2003
35. V. Gurau, F. Barbir and H. Liu, An Analytical Solution of a Half-cell Model for PEM Fuel Cells, *Journal of Electrochemical Society*, Vol. **147**, No. 7, pp. 2468-2477, 2000
36. F. Barbir, J. Braun, and J. Neutzler, Properties of Molded Graphite Bi-Polar Plates for PEM Fuel Cells, *International Journal on New Materials for Electrochemical Systems*, No. 2, pp. 197-200, 1999

37. F. Barbir and T. Gomez, Efficiency and Economics of Proton Exchange Membrane (PEM) Fuel Cells, *Int. J. of Hydrogen Energy*, Vol. **22**, No. 10-11, pp. 1027-1037, 1997
38. M. Nadal and F. Barbir, Development of a Hybrid Fuel Cell/Battery Powered Electric Vehicle, *Int. J. of Hydrogen Energy*, Vol. **21**, No. 6, pp. 497-506, 1996
39. F. Barbir, H.J. Plass, Jr., and T.N. Veziroglu, Modeling of Hydrogen Penetration in the Energy Market, *Int. J. Hydrogen Energy*, Vol. **18**, No. 3, pp. 187-195, 1993
40. T.N. Veziroglu and F. Barbir, Hydrogen: The Wonder Fuel, *Int. J. Hydrogen Energy*, Vol. **17**, No. 6, pp. 391-404, 1992
41. T.N. Veziroglu and F. Barbir, Solar-Hydrogen Energy System: The Choice of the Future, *Environmental Conservation*, Vol. **18**, No. 4, pp. 304-312, 1991
42. F. Barbir and T.N. Veziroglu, A Solar Hydrogen House, *Int. J. Ambient Energy*, Vol. **12**, No. 3, pp. 121-126, 1991

Conference Papers in Proceedings:

1. A.Z. Tomić, I. Pivac, F. Barbir: Characterization of PEM water electrolysis cell with electrochemical impedance spectroscopy, 8th European Fuel Cell Technology & Applications Piero Lunghi Conference (EFC19) V. Cigolotti (ed.), ENEA, 2019. 163-164, Napulj, Italija, 9-11 prosinac 2019.
2. A. Stoilova, F. Barbir, Ž. Penga; Estimating temperature in the catalyst layer of the PEM fuel cell, 8th European Fuel Cell Technology & Applications Piero Lunghi Conference (EFC19) V. Cigolotti (ed.), ENEA, 2019. 37-38, Napulj, Italija, 9-11 prosinac 2019.
3. F. Zenith, I. J. Halvorsen, I. Pivac, D. Bezmalinović, F. Barbir: Electrochemical Low-Frequency Impedance Spectroscopy for Diagnostics of Fuel Cells, IEEE Vehicle Power and Propulsion Conference (IEEE-VPPC'2019) Hanoi, Vietnam, 14-17 listopad 2019.
4. J. Šimunović, F. Barbir, G. Radica, B. Klarin, Techno-economic analysis of PV/wind turbine stand-alone energy system, 4th International Conference on Smart and Sustainable Technologies (SpliTech2019), Split i Bol na Braču, Hrvatska, 18-21 lipnja 2019.
5. Ž. Penga, G. Radica, I. Tolj, F. Barbir, Experimental investigation of dynamic performance of PEM fuel cell using a segmented single-cell, 4th International Conference on Smart and Sustainable Technologies (SpliTech2019), Split i Bol na Braču, Hrvatska, 18-21 lipnja 2019.
6. Ž. Penga, J. Penga, F. Barbir, Influence of Channel and Substrate Hydrophobicity on the Dynamic Water Transport Inside PEM Fuel Cell Channels, 4th International Conference on Smart and Sustainable Technologies (SpliTech2019), Split i Bol na Braču, Hrvatska, 18-21 lipnja 2019.
7. Ž. Penga, I. Tolj, G. Radica, F. Barbir, Transient CFD Analysis of 1 kW Air-Cooled PEM Fuel Cell Stack During Startup, Hypothesis XIV, Foz do Iguazu, Brazil, 23.-27. travnja 2019.
8. I. Pivac, I. Halvorsen, D. Bezmalinovic, F. Barbir, F. Zenith, Low-frequency EIS intercept as a diagnostic tool for PEM fuel cells degradation, Proc. 7th European Fuel Cell Piero Lunghi Conference, V. Cigolotti (ed.), ENEA, 2017. 231-232, Naples, Italy, 12-15 December 2017
9. Ž. Penga, I. Pivac, I. Tolj, F. Barbir: Tracking the process at PEM fuel cell cathode in h-x diagram, 24th International Symposium on Heating, Refrigerating and Air Conditioning (Interklima 2017), Sveučilište u Zagrebu, FSB - Zagreb, 2017. (ISSN 1848-0527)

10. Ž. Penga, F. Barbir, Computational fluid dynamics model of high performance Proton Exchange Membrane fuel cell without external humidification, Proc. Int. Congress on Energy and Environment, Opatija 26-28. October 2016, pp. 147-156
11. J. Šimunović, F. Barbir, Simulation and analysis of an electrolyzer operation in a stand alone renewable energy system, Proc. Int. Congress on Energy and Environment, Opatija 26-28. October 2016, pp. 277-286
12. A. Aljinović, G. Radica, F. Barbir, Analysis of cogeneration system with fuel cell, Proc. Int. Congress on Energy and Environment, Opatija 26-28. October 2016, pp. 157-168
13. A.L. Facci, G. Loreti, S. Ubertini, F. Barbir, T. Chalkidis, R.-P. Eßling, T. Peters, E. Skoufa, R. Bove, Numerical assessment of an automotive derivative CHP fuel cell system, Proc. 8th Intl. Conference on Applied Energy ICAE2016, Beijing, 8-11. October, 2016
14. T. Vešović, A. Nakajo, F. Greco, J. Van Herle, F. Barbir, P.Burdet, Homogenization of the thermo-elastic properties of SOFC stacks operating for 1900 and 4700h; Volume and grid independence study of SOFC stacks, 12th European SOFC and SOE Forum, EFCF 2016, Luzern, Switzerland, 5-8 July, 2016
15. I. Pivac, D. Bezmalinović, F. Barbir, Electrochemical Impedance Spectroscopy for PEM Fuel Cell Degradation Diagnostics, Proc. 6th European Fuel Cell Piero Lunghi Conference, V. Cigolotti (ed.), ENEA, 2015. 171-173, Naples, Italy, 16-18 December 2015
16. I. Pivac, B. Simic, D. Bezmalinovic, F.Barbir, Inductance at Low Frequencies in Electrochemical Impedance Spectroscopy of PEM Fuel Cells, (paper A0807) European Fuel Cell Forum EFCF2015, Luzern, Switzerland, 30 June – 3 July 2015
17. J. Simunovic, D. Bagaric, N. Goles, D. Bezmalinovic, G. Radica, F. Barbir, Hour by hour simulation of solar hydrogen energy system in conjunction with renewable energy sources, (paper B1504) European Fuel Cell Forum EFCF2015, Luzern, Switzerland, 30 June – 3 July 2015
18. D. Bezmalinović, G. Magazinović, F. Barbir, Analysis of Fuel Cell Stacks Degradation by Polarization Change Curves, Proc. 2014 IEEE Vehicle Power and Propulsion Conference VPPC2014, P.J.G. Pereirinha (ed.), IEEE, 2014. 139-141, Coimbra, Portugal, 27—30.10. 2014.
19. F. Barbir, Hydrogen Islands Initiative, Proc. World Hydrogen Energy Conference WHEC2014, IAHE, 2014. 1673-1688, Gwangju, Korea, 6-9 June, 2014
20. F. Barbir, D. Bezmalinović, Generation of hydrogen from renewable energy sources, 10. International Conference on Energy and Process Plants and 5. International Forum on Renewable Energy, Rovinj, Croatia, 24-26 October, 2012.
21. F. Barbir, D. Bezmalinović, A. Vukman, Optimization of Fuel Cells Role in Autonomous Photovoltaic Systems, Eurosun 2012, ISES-Europe Solar Conference, Opatija, Croatia, 18-20 September, 2012
22. F. Barbir, D. Bezmalinovic, A. Vukman, Role of fuel cells in PV-based systems for remote sites, Proc. EFC2011 European Fuel Cell - Piero Lunghi Conference & Exhibition, December 14-16, 2011, Rome, Italy, Paper # EFC11139
23. S. Bargigli, F. Barbir, G. Fiorentino, M. Founti, D. Giannopoulos, K.H. Kettl, P. Masoni, A. Moreno, R. Mubbala, M. Narodoslawsky, R. Steinberger-Wilckens, S. Ulgiati, A. Vukman, A. Zamagni, A. Zucaro. An LCA Evaluation of MCFCS, SOFCS and PEMFCS, Towards

Product Category Rules and Environmental Product Declaration, Proc. EFC2011 European Fuel Cell - Piero Lunghi Conference & Exhibition, December 14-16, 2011, Rome, Italy, Paper # EFC11161

24. F. Barbir, I. Tolj, D. Bezmalinovic, Maintaining desired temperature and humidity throughout a fuel cell, ECS Transactions, PEM Fuel Cells 11, Volume 41, No 1, 2011. pp. 1879-1886
25. F. Barbir, Future of hydrogen and fuel cells Proc. HYCELTEC 2011, III Iberian Symposium on Hydrogen Fuel Cells and Advanced Batteries, Barreras, F.; Mustata, R.; Lozano, A.; Valino L.; Picazo J.A. (Eds.). Zaragoza : Spanish National Research Council, 2011. 71-74
26. D. Bezmalinovic, F. Barbir, Fuel cell stack operation with low cathode stoichiometry with cells or sections fed in series, ECS Transactions, PEM Fuel Cells 9, Volume 25, No 1, 2009. pp. 2009-2017
27. I. Tolj, M. Abdallah and F. Barbir, Thermal Behavior of an Air Cooled PEM Fuel Cell Stack, ECS Transactions, PEM Fuel Cells 8, Volume 16, No. 2, 2008. pp. 535-542.
28. F. Barbir, M. Abdallah, I. Tolj and I. Bezmalinovic, Analysis and Modeling of PEM Fuel Cell Stack Thermal Behavior During Variable Power Operation, ASME Paper EFC2007-39101, Proc. 2nd European Fuel Cell Technology and Applications Conference, Rome, Italy, 11.-14. December, 2007, pp. 131-132.
29. A. Spies, F. Barbir, H. Görgün, and G. Scharfenberg, Optimal Power Management and Control for an Automotive Fuel Cell System, ASME Paper EFC2007-39160, Proc. 2nd European Fuel Cell Technology and Applications Conference, Rome, Italy, 11.-14. December, 2007, pp.203-204.
30. F. Barbir and I. Tolj, The Role of Fuel Cells in Energy Independent Buildings, Abstract Proceedings, 2007 Fuel Cell Seminar and Exposition, San Antonio, TX, October 15-19, 2007. Page 283.
31. F. Barbir, H. Gorgun and X. Wang, Observation of pressure drop behavior in an operating fuel cell stack, *ASME Power 2005*, ASME, Chicago, April 2005, paper PWR2005-50074, pp. 899-903
32. H. Xu, H. Gorgun, J. Hayes and F. Barbir, Comparison of Current Interrupt and AC Impedance Techniques for Resistance Measurement in PEM Fuel Cells, Electrochemical Society Meeting, Quebec City, Canada, May 2005, Meeting Abstracts, pp. 1522
33. F. Barbir, H. Gorgun and X. Wang, Cathode Pressure Drop as a Diagnostic Tool for Detection of Flooding and Drying Conditions in PEM Fuel Cells, Electrochemical Society Meeting, Quebec City, Canada, May 2005, Meeting Abstracts, pp. 1508
34. F. Barbir, H. Gorgun and X. Wang, Electrochemical Hydrogen Pump for Recirculation of Hydrogen in a Fuel Cell Stack, Electrochemical Society Meeting, Quebec City, Canada, May 2005, Meeting Abstracts, pp. 821
35. F. Barbir, S. Nomikos and M. Lillis, Performance Experience with Regenerative Fuel Cell Back-up Power Systems, Proc. 2003 Fuel Cell Seminar, Miami Beach, FL, pp. 1020-1023, 2003.
36. F. Barbir, L. Dalton and T. Molter, Regenerative Fuel Cells for Energy Storage: Efficiency and Weight Trade-offs, International Energy Conversion Engineering Conference, AIAA paper #2003-5937, 2003

37. S.A. Sherif, F. Barbir, and T.N. Veziroglu, Wind Energy and the Hydrogen Economy, 2003 ASME Wind Energy Symposium, pp.155-166, AIAA-2003-0691, 2003
38. F. Barbir, T. Maloney, T. Molter and F. Tombaugh, Fuel Cell Stack and System Development: Matching Market to Technology Status, Proc. 2002 Fuel Cell Seminar, Palm Springs, CA, November 18-21, pp. 948-951, 2002
39. B. Balasubramanian, F. Barbir, R. Byron, and M. Stone, Design Optimization and Simplification of PEM Fuel Cell Systems for Back-Up Power Applications, Proc. ACS Annual Meeting, Boston, August 19-22, 2002, ACS Division of Fuel Chemistry, Preprints 47 (2), pp. 611-613
40. F. Barbir, PEM Fuel Cell Technology Status and Applicability for Propulsion of Autonomous Underwater Vehicles, Proceedings of the IEEE Symposium on Autonomous Underwater Vehicle Technology, San Antonio, TX, June 20-21, 2002, pp. 65-69
41. F. Barbir, PEM Fuel Cell Stack Design Considerations, Proc. Fuel Cell Technology: Opportunities and Challenges, pp. 520-530, 2002 AIChE Spring National Meeting, New Orleans, March 2002
42. F. Barbir, M. Fuchs, A. Husar and J. Neutzler, Design and Operational Characteristics of Automotive PEM Fuel Cell Stacks, *Fuel Cell Power for Transportation*, SAE SP-1505, pp. 63-69, SAE, Warrendale, PA, 2000
43. M. Fuchs, F. Barbir, A. Husar, J. Neutzler, D. Nelson, M. Ogburn, and P. Bryan, Performance of Automotive Fuel Cell Stack, SAE paper 00FCC-11, SAE, Warrendale, PA, 2000
44. F. Barbir, B. Balasubramanian and J. Neutzler, Trade-off Design Study of Operating Pressure and Temperature in PEM Fuel Cell Systems, Advanced Energy Systems Vol. 39, pp. 305-315, ASME, 1999
45. B. Balasubramanian, F. Barbir and J. Neutzler, Optimal Operating Temperature and Pressure in PEM Fuel Cell Systems in Automotive Applications, proc. 218 ACS National Meeting, Vol. 44, No. 4, pp. 977-981, American Chemical Society, 1999
46. F. Barbir, J. Braun, and J.Neutzler, Effect of Collector Plate Resistance on Fuel Cell Stack Performance, in *Proton Conduction Membrane Fuel Cells II*, S. Gottesfeld and T.F. Fuller (eds.), Proc. Vol. 98-27, pp. 400-406, The Electrochemical Society, Pennington, NJ, 1999
47. V. Gurau, F. Barbir, and H. Liu, Two-Dimensional Model for the Entire PEM Fuel Cell Sandwich, in *Proton Conduction Membrane Fuel Cells II*, S. Gottesfeld and T.F. Fuller (eds.), Proc. Vol. 98-27, pp. 479-503, The Electrochemical Society, Pennington, NJ, 1999
48. F. Barbir, B. Bahar, and J.A. Kolde, Development of 10 kW PEM Fuel Cell Stack with Advanced Membrane/Electrode Assemblies, Electrochemical's Society 160th Meeting Abstracts, Vol. 96-2, pp. 134-135, Electrochemical Society, Pennington, NJ, 1996
49. F. Barbir, F. Marken, B. Bahar, and J. Kolde, Development of a 10 kW Hydrogen/Air PEM Fuel Cell Stack, Proc. Fuel Cell Seminar, Kissimmee (Orlando), Florida, pp. 505-508, 1996
50. M. Graham, F. Barbir, F. Marken, and M. Nadal, Fuel Cell Power System for Utility Vehicle, Proc. 1996 Fuel Cell Seminar, Kissimmee (Orlando), Florida, pp. 571-574, 1996
51. F. Barbir, Control Strategy of a Vehicular Fuel Cell Power System, in *Hydrogen Energy Progress XI*, T.N. Veziroglu, C.-J. Winter, J.P. Baselt, and G. Kreysa (eds.), Vol. 2, pp. 1695-1706, proc. 11th World Hydrogen Energy Conference, Stuttgart, Germany, 1996

Other Conference Papers, Invited Lectures and Presentations:

1. How Hydrogen Could Help Decarbonizing Energy Supply by 2050, International Conference on Emerging and Renewable Energy: Generation and Automation (ICEREGA2019), Istanbul, 30. October – 1. November, 2019.
2. Role of Hydrogen Technologies in Decarbonization of Energy Supply, invited keynote lecture at 17th International Conference on Clean Energy, Shenyang, Kina, 9-12 August 2019.
3. Future of Hydrogen, Invited keynote lecture at 9th Intl. Conference on Hydrogen Production ICH2P 2018, Zagreb, Croatia, 14-16 July 2018
4. Applied Hydrogen Technologies, Invited lecture/workshop, Anadolu Energy Symposium AES2018, Edirne, Turkey, 18-20 April 2018.
5. Ž. Penga, I. Pivac, F. Barbir, Coolant induced variable temperature flow field for PEM fuel cells: Experimental validation of the developed CFD model, 15th Symposium on Modeling and Experimental Validation of Electrochemical Energy Devices (Modval 2018), pp. 147-148, Aarau, Switzerland, 12-13. April 2018.
6. F. Barbir, Ž. Penga, I. Pivac, Segmented fuel cell for verification of variable temperature flow field concept, 232th Meeting of the Electrochemical Society, National Harbor, MD, 1-5 October 2017.
7. F. Barbir, J. Šimunović, N. Pivac, Small scale hydrogen energy system, World Hydrogen Technology Conference (WHTC), Prague, Czech Republic, 9-12 July 2017.
8. F. Barbir, Status of hydrogen technologies and their role in energy future, plenary lecture at VI Symposium on Hydrogen Fuel Cells and Advanced Batteries, Hyceltec 2017, Porto, Portugal, 19-23 June 2017.
9. F. Barbir, I. Pivac, D. Bezmalinovic, Diagnostics of PEM Fuel Cells Degradation, Keynote lecture at VI Symposium on Hydrogen Fuel Cells and Advanced Batteries, Hyceltec 2017, Porto, Portugal, 19-23 June 2017.
10. F. Barbir, Hydrogen and Fuel Cells Technologies: Status and Perspectives and Their Role in the Energy System of the Future, Keynote lecture at 9th International Exergy, Energy and Ennvironment Symposium IEEES9, Split, Croatia, 14-17 May 2017
11. F. Barbir, Hydrogen and low-carbon energy strategy, Invited lecture at 32. International Scientific & Expert Meeting of Gas Professionals, Opatija, Croatia, 3-5 May 2017
12. I. Pivac, F. Barbir: Modeling of inductive phenomena at low frequencies in electrochemical impedance spectroscopy of PEM fuel cell, 14th Symposium on Fuel Cell and Battery Modelling and Experimental Validation (ModVal 14), Karlsruhe, Germany, 02.-03. March.2017.
13. Ž. Penga, I. Pivac, F. Barbir: Segmented PEM fuel cell for verification of the variable temperature flow field concept, 14th Symposium on Fuel Cell and Battery Modelling and Experimental Validation (ModVal 14), Karlsruhe, Germany, 02.-03. March.2017.
14. F. Barbir, Role of Hydrogen in Energy Systems with Large Share of Renewable Energy, Proc. Int. Congress on Energy and Environment, Opatija 26-28. October 2016, pp. 617-618
15. I. Pivac, Z. Penga, F. Barbir, Water balance in non-humidified fuel cell with different membrane thicknesses, 230th Meeting of the Electrochemical Society, Honolulu, HI, 2-7 October 2016.

16. J. Šimunović and F. Barbir, Operation of an electrolyzer in a stand alone renewable energy system, International Multidisciplinary Conference on Computer and Energy Science, Splitech2016, Split, Croatia, 13-15. July, 2016.
17. J. Šimunović, N. Goleš, D. Bagarić and F. Barbir, Role of hydrogen in a country's 100% renewable energy future 21st World Hydrogen Energy Conference WHEC 2016. Zaragoza, Spain. 13-16th June, 2016
18. Ž. Penga, I.Pivac, I. Tolj and F. Barbir, Variable temperature flow field for proton exchange membrane fuel cells, 21st World Hydrogen Energy Conference WHEC 2016. Zaragoza, Spain. 13-16th June, 2016
19. F. Barbir, Role of Hydrogen in Future Renewable Energy System, Invited Keynote Lecture at 4th International Conference on Renewable Energy: Generation and Applications, ICREGA 2016, Belfort, France, 8-10 February 2016.
20. F. Barbir, Polarization Change Curves for Characterization of Fuel Cell Stacks Performance Degradation, CARISMA Conference, Cape Town, South Africa, 1-3 December 2014.
21. F. Barbir, Hydrogen Islands Initiative, 20th World Hydrogen Energy Conference (WHEC2014), Gwangju, Korea, 15-20 June 2014.
22. F. Barbir, Hydrogen Fuel for Transportation: Past, Present and Future, Invited Keynote Lecture at IDHEA International Discussion on Hydrogen Energy and Applications, Nantes, France,12-14 May 2014
23. F. Barbir, Water and Heat Management in PEM Fuel Cells, Invited Keynote Lecture at 5th International Conference on Fundamentals and Development of Fuel Cells, Karlsruhe, Germany, 16-18 April 2013
24. F. Barbir, Heat and Mass Transfer in PEM Fuel Cells, Sofia Electrochemical Days, Sofia, Bulgaria, 10-13 December 2012
25. F. Barbir, Hydrogen Energy Technologies and their Role in Future Energy System Based on Renewable Energy Sources, EUROSUN 2012, ISES Europe Solar Conference, Rijeka-Opatija, 19-20 September 2012
26. F. Barbir, PEM Fuel Cells Diagnostics as Design Tool, Joined D-CODE & GENIUS annual workshop, Belfort, France, 13-14 June, 2012
27. F. Barbir and D. Bezmalinovic, Application of Hydrogen Technologies in Stand Alone Remote Energy Systems, 4th International Forum on Renewable Energy, Dubrovnik, Croatia, 1 October 2010.
28. F. Barbir, Demonstration of a Fuel Cell Powered Boat, 18th World Hydrogen Energy Conference (WHEC2010), Essen, Germany, 16-21 May 2010.
29. F. Barbir, Energy/Gas Technologies Between Science and Applications, XXV International Scientific/Professional Meeting of Gas Experts, Opatija, Croatia, 5-7 May 2010.
30. F. Barbir Role of Renewable Energy in De-Growth Future, Conference on Economic De-growth and Sustainable Development, University of Barcelona, Barcelona, Spain, 26-28. March 2010.
31. F. Barbir, ICHET's Hydrogen Island Initiative: Projects Update, STORIES Project Conference, Estoril, Portugal, 24-25. March 2010.

32. F. Barbir, Hydrogen – One of Energy Carriers for Future Energy Supply, 10. Intl. Conference SLOBIOM 2009: Organic Agriculture and Healthy Food, Renewable Energy and Raw Materials for South-East Europe until 2030, Ljubljana 16. October 2009.
33. F. Barbir, Hydrogen Islands Initiative, STORIES project Workshop, 5th Dubrovnik Conference on Sustainable Development of Energy Water and Environment Systems, Dubrovnik 2. October 2009.
34. F. Barbir, The role of Hydrogen in Energy Supply in the Future, Hrvatsko Energetsko Drustvo, Forum Dan energije, Zagreb, November 2008.
35. F. Barbir, Hydrogen – Is there a future or not? 3rd International Forum on Renewable Energy, Dubrovnik, Croatia, 22-24 September 2008
36. Fuel Cells: Engineering and Applications, Invited Keynote Lecture at First Regional Symposium on Electrochemistry for South-East Europe, Rovinj, Croatia, 4-8 May 2008.
37. Fuel Cells: Status of Development and Applications, Invited Keynote Lecture at International Hydrogen Energy Congress and Exhibition, Istanbul, Turkey, 13-15 July 2007
38. F. Barbir, Role of Hydrogen in Renewable Energy Utilization Systems, 2nd International Forum on Renewable Energy, Dubrovnik, Croatia, October 2006
39. F. Barbir, Transition to Hydrogen Economy: How Soon and How Fast? International Workshop Advances in Energy Studies, Porto Venere, Italy, September 2006
40. F. Barbir, Current Status and Challenges in PEMFC Stacks, Systems and Applications, Keynote Lecture, 16th World Hydrogen Energy Conference, Lyon, France, June 12-16, 2006
41. F. Barbir, Current Status and Challenges in Development of PEMFC Stacks and Systems Including Electrolyzers and Regenerative Fuel Cells, International Fuel Cell Symposium, Yuan Ze University, Chung-Li, Taiwan, September 2005
42. Fuel Cells and Hydrogen Economy, invited lecture at the International Hydrogen Energy Congress and Exhibition, Istanbul, Turkey, July 2005
43. F. Barbir, Hydrogen for Sustainable Development, invited lecture at the Dubrovnik Conference on Sustainable Development of Energy, Water and Environmental Systems, Dubrovnik, Croatia, June , 2005
44. F. Barbir, Hydrogen from Renewables: Timing and Economics, National Hydrogen Association Hydrogen Conference 2005, Washington, DC, March-April, 2005
45. O. Chow, J.Friedman, D. Halter and F. Barbir, Evaluation of a Novel Design Air-Cooled 1 kW PEM-Based Fuel Cell Stack, 1st International Conference on Fuel Cell Development and Deployment, Storrs, CT, March 7-10, 2004.
46. F. Barbir, L. Moulthrop and H. Vock, High Pressure Hydrogen Generation by PEM Electrolysis, 10. Symposium on Use of Renewable Energy Sources and Hydrogen Technology, Fachhochschule Stralsund, Stralsund, Germany, November, 2003
47. F. Barbir and T.N. Veziroglu, Hydrogen Economy: Status and Outlook, 1st Intl. Conf. On Energy Efficiency and Conservation, Hong Kong, January 15-17, 2003
48. F. Barbir, PEM Fuel Cells Design, Engineering, Modeling and Diagnostic Issues, invited lecture at the NSF Workshop on Engineering Fundamentals of Low Temperature PEM Fuel Cells, Arlington, VA, November 2001

49. M. Fuchs, F. Barbir and M. Nadal, Performance of Third Generation Fuel Cell Powered Utility Vehicle #2 with Metal Hydride Fuel Storage, 1st European Polymer Electrolyte Fuel Cell Forum, Luzern, Switzerland, July 2001
50. F. Barbir and J. Braun, Development of Low Cost Bi-Polar Plates for PEM Fuel Cells, Fuel Cell 2000 Research & Development, Strategic Research Institute Conference, Philadelphia, September 2000
51. F. Barbir, PEM Fuel Cells: Technology and Applications; Status and Perspectives, Hydrogen: Planning the Bridge to Florida's Future Summit Meeting, Organized by Florida Solar Energy Center, Tallahassee, Florida, October 2000
52. F. Barbir, Air, Water and Heat Management in Automotive Fuel Cell Systems, Proc. Intertech Conference Commercializing Fuel Cell Vehicles 2000, Berlin, Germany, April 2000
53. F. Barbir, Bi-polar Plates, Flow Fields and Stack Design Criteria, American Physical Society Meeting, Minneapolis, MN, March 2000

SHORT COURSES/WORKSHOPS/SEMINAR LECTURES

- Heat and Water Management in PEM Fuel Cell without External Humidification of Reactant Gases, Seminar lecture at Newcastle University, Newcastle upon Tyne, UK, 12. December 2019
- Diagnostics of PEM Fuel Cells, Seminar lecture at Beijing University of Technology, Beijing, China, 12. August 2019
- Variable temperature flow field concept in PEM fuel cells: CFD modeling and experimental verification, Seminar lecture at Milan Polytechnic University, 24 May 2018
- Applied Hydrogen Technologies, Workshop at 4th Anatolian Energy Symposium with International Participation, Trakya University, Edirne, Turkey, 18-20 April 2018
- PEM Fuel Cells Degradation Diagnostics, Seminar Lecture at Argonne National Laboratory 21 February 2017.
- Hydrogen and Low Carbon Energy Strategy, Seminar Lecture at Trieste University 04. May 2017.
- Water and Heat Management in PEM Fuel Cells, Seminar Lecture at Indiana University Purdue University in Indianapolis (IUPUI), 11 February 2015.
- Degradation Mechanisms and Characterization of PEM Fuel Cells, lecture at Summer School Diagnostics and Prognostics of Fuel Cell Systems, FCLAB, Belfort, France, 01-04 July 2014.
- PEM Fuel Cells I and II and Outlook for PEM Fuel Cells, lectures 3rd Joint European Summer School for Fuel Cell and Hydrogen Technology, Iraklion, Greece, 23-27 September 2013.
- Water and Heat Management in PEM Fuel Cells, Seminar Lecture at Aalborg University, Aalborg, Denmark, 21 May 2013.
- General Introduction to Fuel Cell Electrochemistry; Cell and Stack Design, lectures at 2nd Joint European Summer School for Fuel Cell and Hydrogen Technology, Iraklion, Greece, 24-28 September 2012,
- Engineering Aspects of Fuel Cells, lecture at 6th European Summer School on Electrochemical Engineering, Zadar, Croatia, 16-21 September 2012

- Fuel Cells: Past, Present Status and Applications, and Future Trends, Seminar Lecture at University of Wyoming, Laramie, WY, 10 April 2012
- Thermodynamics and Electrochemistry of Low Temperature Fuel Cells; How to Progress on Low Temperature PEM Fuel Cells, lectures at First Joint European Summer School for Fuel Cell and Hydrogen Technology, Viterbo, Italy, 28 August – 02 September 2011
- PEM Fuel Cells, Metal Hydrides, Reforming, Safety Aspects, Global Penetration of Hydrogen, Lectures at Seminar on Hydrogen and Fuel Cells, Zagreb, Croatia, 02 December 2010
- Fuel Cell Stack Design; Design Principles of Fuel Cell Systems lectures at International Summer School on PEM Fuel Cells Applications and Integrations, Istanbul, Turkey, 19-23 July, 2010.
- PEM Fuel cell Systems; Current State of PEM Fuel Cell Development; Toward World Hydrogen Economy, invited lectures at HySA Training Week, University of Western Cape, Bellville, South Africa, 12-16 April, 2010.
- Hydrogen and Fuel Cells, lecture at Seminar on Renewable Energy Sources, Center for Technology Transfer, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, 19 February, 2010.
- Engineering Aspects of PEM Fuel Cells Research and Development, lecture at Institute Rudjer Boskovic, Zagreb, Croatia, 13. July 2010.
- Introduction to PEM Fuel Cells: Operating Principles, Stack and System Design and Applications, Two-day short course at UNIDO International Centre for Hydrogen Energy Technologies, Istanbul, Turkey, 16-17 September 2009.
- Introduction to PEM Fuel Cells: Operating Principles, Stack and System Design and Applications, lectures at Seminar/Workshop Smart energy systems and fuel cells: on path to a sustainable future, Trieste University, Trieste, Italy 26. June, 2009.
- Fuel Cell Basics – Overview; Fuel Cell Heat Management, lectures at International Summer School on PEM Fuel Cell Fundamentals Istanbul, 14-18 July, 2008.
- Fuel Cell Technology Status and Obstacles for Commercialization, lecture at Bocconi University, Milan, Italy, 23. May 2008.
- How to make electricity from solar energy when the sun is not shining, lecture at Science Fest, Grahamstown, South Africa, 18 April, 2008.
- Fuel Cells: Technology and Applications, seminar lecture at TOBB University of Economics and Technology, Ankara, Turkey, 15. February, 2008.
- Fuel Cell Basic Chemistry, Electrochemistry and Thermodynamics; Fuel Cell Stack and System Design Principles with Some Design Concepts of Micro-Mini Fuel Cells, lectures at NATO Advanced Study Institute on Mini-Micro Fuel Cells as Electric Energy Generators, Çeşme-Izmir, Turkey, 22. July – 3. August, 2007.
- PEM Fuel Cell Stacks and Systems: Design Principles, Challenges and Perspectives, 3 lectures (Stacks, Systems and Applications) at Workshop on Fuel Cells, International Centre for Condensed Matter Physics, University of Brasilia, Brasilia-DF, Brazil, 9-13 April, 2007.
- Current status and challenges in PEM fuel cells deployment (and resulting R&D opportunities), lecture at Advanced Workshop Energies for the Future, Istanbul Technical University, Istanbul, Turkey, 7-9 December, 2006.

- Electricity Generation with Fuel Cells, International Advanced Course on Renewable Energies, RERDEC, Istanbul, Turkey, June 2006.
- Fuel Cell Fundamentals, Design, Operation and Applications; Mechanical Engineer's Adventures in PEM Fuel Cells R&D, two seminar lectures at Nigde University, Nigde, Turkey, June 2006.
- Fuel Cell Systems and System Integration, Training Course at TUBITAK Marmara Research Center, Gebze, Turkey, 5-8 December, 2005
- Hydrogen Energy System: Activities, Structure, Strategy and International Cooperation, lecture at Bulgarian Academy of Sciences and Arts, Sofia, Bulgaria, November 2005.
- Fundamentals Workshop: How Fuel Cells Work…, Fuel Cell Summit 2005, Society of Manufacturing Engineers, Mohegan Sun, Connecticut, October 2005.
- Mechanical Design and Analysis of Fuel Cell Stack; Fuel Cell System Design; Fuel Cell Performance Testing, Monitoring and Diagnostics; 3 lectures at Yuan Ze University, Taiwan, September 2005.
- The Energy Problems at a Large Scale: Hydrogen, Myth or Solution? Lecture at Summer Courses Aranjuez 05 – University Rey Juan Carlos, Aranjuez, Spain, 12 July, 2005.
- Mechanical Engineer's Adventures in PEM Fuel Cells R&D; Theory and Applications of Emergy Analysis; two seminar lectures at University of Victoria, Victoria, BC, Canada, March 2005.
- Fuel Cell Systems Engineering and Modeling Methods for PEMFC, Short Course at Connecticut Global Fuel Cell Center, University of Connecticut, Storrs, CT, March 2004.
- Fuel Cell Engineering, Short Course at University of Connecticut, Storrs, CT, 2002.
- Theory and Applications of Emergy Analysis, lecture at Workshop on Well-to-Wheels Comparisons for Alternative Fueled Vehicles, Intertech Conference, Nice, France, May 2001.
- Automotive Fuel Cell System Engineering, Short Course at Intertech Conference Commercializing Fuel Cell Vehicles, Berlin, Germany, 2000.

PATENTS

1. Patent Application #15787914.9 – 1568 – Control of an electrochemical device with integrated diagnostics, prognostics and lifetime management. 16.10.2015.
2. U.S. Patent # 7,159,444 – Combustible gas detection systems and method thereof (2007)
3. U.S. Patent # 7,153,409 – Electrochemical cell system and method of operation (2006)
4. U.S. Patent # 7,006,898 – Method and apparatus for operating and controlling a power system (2006)
5. U.S. Patent # 6,994,929 – Electrochemical hydrogen compressor for electrochemical cell system and method for controlling (2006)
6. U.S. Patent # 6,617,065 – Method and Apparatus for Maintaining Neutral Water Balance in a Fuel Cell System (2003)
7. U.S. Patent # 6,551,736 – Fuel Cell Collector Plate with Improved Mass Transfer Channels, (2003)
8. U.S. Patent # 6,207,312 – Self-Humidifying Fuel Cell, (2001)